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THE USE OF MILK RECORDS, AND HOW TO KEEP THEM.

By the late JOHN SPEIR, Kgt. St. Olav, Newton.

By the enthusiast in dairying, the man of leisure or of wealth, records have been kept of the yield of milk of a limited number of cows for generations. Until within the last 20 or 25 years such was generally done by measuring the milk, but for a number of years measuring has been all but abandoned in favour of weighing. There are two special reasons for this change, viz.: the quantity of recently-drawn milk can be more accurately determined by weighing than by measuring, as the froth on it renders measuring very unreliable; weighing can, besides, be done much more quickly than measuring. Everything is, therefore, in favour of weighing.

Prior to the discovery of Dr. Babcock's rapid method of determining the fat in milk, by the use of sulphuric acid and centrifugal force, the butter fat in milk could only be estimated by chemical analysis or by churning. Both methods were somewhat slow, and unless in special cases were too costly for everyday use. The introduction of the Babcock and other methods of estimating the fat in milk have, however, altered all that, and now by them the fat can be determined at little more cost than is incurred in weighing the milk.

Where private records have been kept by enthusiasts in the work, either by measuring or weighing, the work has generally been done at every milking, one day each week, or one day every second or third week. Weighing at every milking is without doubt the most accurate of all the methods yet suggested, but, unless in special cases, the constancy of the work makes it irksome. The labour involved is not great, but it comes at an hour of the day when there is little spare labour on the average dairy farm. The consequence has been that, unless in isolated cases, there are few instances where milk records go back for any great length of time, taken either daily or at wider intervals.

Within recent years, numerous records where the weighings have been made at every milking have been compared with what the results would have been had the weighing been done every seventh, fourteenth, twenty-first, or twenty-eighth day. These clearly indicate that for the two shorter intervals the totals do not materially differ from the actual amount, and that the error arising from this method of estimating the quantity is not likely to exceed

5 or 7 %. The amount is more often under the actual quantity than above it, but it is so trifling that it is scarcely worth taking into account. When, however, the intervals are widened to three weeks or a month, the risk of error is practically doubled. Where cows are regularly and effectively milked, they very rarely give much above their normal quantity, and on that account if the hours of milking are the same as usual a wide interval does not often indicate a quantity much in excess of the actual. If, however, the animal is in any way indisposed on the day on which the milk is weighed, the yield of milk is likely to be considerably under the normal, and as it is multiplied by 21 or 28, according to the width of the interval, the cow is credited with much less than she may have actually yielded.

In the estimation of the fat results may be obtained which, for all ordinary purposes, may be looked on as practically, although not absolutely, correct. Where the milk is weighed at every milking, if half-an-ounce or thereabouts is taken from the weighing can by the ordinary dipping sampler, immediately after the newly-drawn milk has been emptied into it, and put into a bottle large enough to hold a week's supply, the composite sample will be found to be almost identical with the average of samples drawn and tested separately at each milking. In this way the whole milk of a week, or even of a fortnight, may be tested for fat at one time. Where this course is followed, a pinch of bichromate of potash should be put into each bottle. It has the effect of preserving the milk from decomposition, or even curdling, but only sufficient should be used to give the milk a light yellow colour, when the bottle is full. It is poisonous, and the milk should therefore be thrown out after the fat has been determined.

The manner of taking milk records which has made most headway, particularly during recent years, and the one which has been carried through at least cost, is the method of co-operative testing, which originated in Denmark in 1895. By it, twelve or any other number of owners of herds agree to form a small local society, one of their number usually acting as secretary. A young man who has had some training in milk weighing and testing is engaged to do the work, and for this purpose he is provided with a spring balance, Gerber fat tester, measures, chemicals, and a supply of bottles, all of which are methodically arranged in a chest. He generally arrives at each farm in the middle of the afternoon, having been driven there by the farmer whose cows he last tested. He is provided with special sheets for recording the weight of milk yielded by each cow at the evening and morning milkings, and these sheets also have columns for the per cent. of fat. On each occasion two sheets are used, with a carbon paper between, so that two copies are obtained with one writing. One of these is left at the farm, the other is sent to the local secretary, or general secretary of the milk record societies.

Before milking begins every stall is numbered, and thereafter the cow occupying that stall is known to the milk record expert by her number only. At milking time the spring balance is hung in some position where the expert has all the milkers in view, and where he has space and opportunity to carefully sample and weigh each cow's milk as brought to him, without interfering with the time of the milkers, or the milkers interfering with his work. When the weighing can is empty, and hanging on the balance, the dial hand should stand at nothing. The expert has usually his bottles arranged in a numbered frame close beside him, and on a milker bringing forward a cow's milk he ascertains the number, if he does not already know it. As soon as the milk has been emptied into the weighing can, he draws a sample of about half an ounce by his dipper, and this he transfers to the bottle bearing the same number as the cow. Milk is never so accurately sampled as immediately after the operation of milking has been completed, and when emptied into another vessel, an accurate sample can be drawn without any further agitation, stirring, or other precaution. The best results are always obtained by *immediately* drawing the sample after it has been emptied, as the least delay causes some irregularity in the results. This having been done, the can should be hung on the balance, the weight noted and recorded, and the contents transferred to a carrying can, after which the expert is ready to receive another lot.

Besides the sample of milk which is put into the numbered bottle, a jug, bucket, or other vessel is kept near at hand, into which a second sample of the milk of every cow is put. This sample is called a composite sample, and the quantity taken from each cow's milk should roughly correspond with the quantity she gives. For instance, for a cow expected to give off and on about 20 lbs. or 2 gallons of milk, one fill of the dipper may be taken; but for another giving only half the quantity, the dipper should only be half emptied. When the milking is finished, this milk is poured two or three times from one vessel into another, after which a sample is drawn and transferred to a bottle specially labelled for the purpose. The remainder of the milk may afterwards be taken to the dairy, or used in the ordinary way. This work necessitates only two extra samples being tested for fat daily, which in many herds may even be reduced to one, but it is a valuable check on the whole of the work, and should never be omitted.

The following morning the work is a repetition of that done the previous evening. The testing for fat is usually completed during the forenoon, and in order that the expert should be able to do it accurately and speedily, and at little discomfort to the household or himself, he should be provided with room in a place where he can have a bench or table, and where the spilling of water or acid is unlikely to do any harm. As hot water has to be constantly used, unless during warm weather, a supply of it should be easy of access.

The work having been completed, the results are transferred from the byre sheets to the farm book, after which the apparatus is packed in the box, ready for removal to the next farm. This is usually done in the early afternoon, so that the expert may arrive at the next farm in plenty of time to get everything put in order before milking begins.

The byre sheets of the Ayrshire Cattle Milk Record Committee are made in two sizes, one containing space for 37 cows, and another consisting of a double sheet containing lines for 80 cows. In the smaller herds the evening and morning milk of each cow is tested for fat separately, but in those of 25 cows or over the milk is mixed, so that one sample only is tested. The following is a pattern of the sheets used:—

AYRSHIRE CATTLE MILK RECORD COMMITTEE.

Local Society..

Owner of Herd................ *Name of Farm*..............

Date when visit was made and samples taken and tested }............................

Post Town ....

Hour when milking began..........*Evening.* ....*Morning*

No. of Cow	Milk in lbs.			Per Cent. of Fat			Lbs. of Milk of 1 per cent. of Fat per day	Remarks. Extra Food and cost thereof.
	Evening	Morning	Total	Evening	Morning	Average		
1								
2								
3								

Signature of Expert....................

The farm books are made up in two sizes—viz., for 25 and 50 cows—have cloth covers, and are firmly bound. Where the herds contain a larger number of cows than 50, the expert stays two days at the farm, and uses two books. In the book one page is devoted to each cow, and on the page there are sufficient lines to give one for each visit of the expert during the whole period of lactation. The leaves of the farm books are written only on one side, but if a cow should remain so long in milk that all the details cannot be entered on the one side, the other may be used. When the lactation extends over part of two years, the amount is carried forward from the one to the other, and the total of each completed lactation entered at the bottom of the page. It is necessary to have a column for milk of 1% of fat in order to obtain an accurate

average of the per cent. of fat in the milk for the whole lactation. The following is a sample leaf of one of the farm books:—

Cows *Farm No.*	*Cow's Name*	Cows *Herd Book No.*
....	............*Age.* ......*Years.*	....

Sire of Cow .... *Dam of Cow* ....
Date of Last Calving ....*Sex of Calf* ....
Date at Last Service....................*Colour of Calf* ....

Year	Milk in lbs. daily	Gallons of Milk for .... days	Per cent. of Fat	Lb. of Milk of 1 per cent. Fat for .... days	Remarks

Total for the lactation of............*weeks, or season ending as above,* ....*gallons of* 10 *lbs. of an average of*..........% *of fat.*

In the Scottish societies, each farm is known to the secretary by a particular letter, which is affixed to the front page of the book, under which is given the name and address of the owner of the herd. In the printed record of the work, the herd is referred to only by the letter on the book, so that in most of the societies few herds can be definitely identified, unless the very largest or the very smallest. In Denmark the same course was followed for a number of years, as the owners of herds giving a small yield did not like their names to be published, but latterly about half of the societies now publish the names of the owners along with the yield of the cows. Milk records are designed to principally benefit the owner of the herd by enabling him to eliminate his least profitable cows, and to breed only from his best. This he will be enabled to do equally well whether or not the results are published, but the public can only obtain any benefit from the work where the yield of each cow is published, or as in Denmark, where the average of the herd only is stated. It is only when the results are made public that buyers of good stock know where to look for them, so that it is in the interest of all having stock above the average that the names should be made public.

Each member of the Society agrees to provide food and sleeping accommodation for the expert when he visits his farm, and to drive

him to the next farm or nearest railway station when his work is done. In several of the districts some of the farms are so far apart that it is found more convenient for the expert to be driven to and from the nearest railway station than direct from the one farm to the other. In others, in order to be saved the trouble of shifting the expert, the members provide him with a horse and trap, in which case he requires no one to attend him, unless probably on his first visit. In some instances the horse and trap have been purchased by the Society; in others they have been hired for the season. The milk record experts are generally sons of farmers or others who have been trained for this work at the Dairy School for Scotland at Kilmarnock, where there is a class in January intended specially to prepare young men for this work. Dairy and agricultural students who have taken their diplomas, and are desirous of still further increasing their knowledge and experience, offer themselves freely for the vacant positions. The work varies considerably according to the size of the herds. Where the herds are small the experts receive from 20s. to 22s. per week, and where larger somewhat more, with food, lodging, and all other outlays paid. Where a single member is at some distance from the others, and the railway is available, he usually pays the return rail fares of the expert.

In the cheese-making districts the work usually goes on for from nine to eleven months, but on the butter-making and milk-selling farms it goes on continually. At the end of the season, or at the end of the year, each expert sums up the yield of each cow under his charge, and enters the amount in gallons of 10 lbs., the average per cent. of fat, and number of weeks over which the lactation extended, in spaces provided for the purpose at the bottom of each page of the farm book, as shown in the copy above. On a separate sheet he makes a summary of the yield of each cow in every herd, in which the following details are given :

No. of the Cow	Total Milk in Gallons	Average Per cent. of Fat	Total Milk of 3 per cent. of Fat in Gallons	Weeks in Milk	Age of Cow	Date of Last Calving	Remarks

This sheet is made out in duplicate, one of which is left with the owner of the herd, the other being forwarded along with the books to the Secretary of the Milk Records Committee. The copy left with the owner of the herd allows him to utilise the information in deciding what cows he should sell and what retain, as it is often a considerable time before the books can be checked, summarised, and returned.

The Milk Records Committee, which supervises and controls the work in Scotland, is composed as follows :—

Five members from the Ayrshire Cattle Herd Book Society.
Two members from the Highland and Agricultural Society.
One member from each Milk Record Society.

The Highland and Agricultural Society contributes £200 to the funds of the Society on the condition that it publishes annually a summary of the yield of each cow tested. The Ayrshire Cattle Herd Book Society contributes £40 annually, without any reservation as to how it is to be spent. The extra expense of the work in excess of these grants is met by the members. The Ayrshire Agricultural Association, the Glasgow Agricultural Society, and the Fenwick Farmers' Society give special prizes for cows which according to the milk records have yielded from 600 up to 1,200 gallons in one year. Even the latter class has usually a considerable number of entries. This class is only competed for at Fenwick, near Kilmarnock.

The Scottish milk records have done a great deal to clear up many doubtful points in connection with the production of milk. One of these is the very common belief that heavy milking cows as a rule give milk of a lower per cent. of fat than those which give very little. This belief has undoubtedly had a strong influence in inducing breeders to continue to use animals which should have been slaughtered long before. In the report on the Scottish milk records of 1903, 1904, 1905, and 1906, 10 per cent. of the most profitable animals in every herd were compared with an equal number of the least productive ones, with the following results:—

YEAR	Number of Cows on which the Average is based	Period of the Test in Weeks	10 per cent. of the most productive Cows		10 per cent. of the least productive Cows	
			Average Milk in Gallons	Average per cent. of Fat	Average Milk in Gallons	Average per cent. of Fat
1903	90	26	545	3·84	318	3·50
1904	38	30	643	3·80	396	3·48
1905	44	52	915	3·89	563	3·61
1905	35	34	635	3·90	429	3·68
1906	60	26	685	3·95	423	3·63
Total	267					
Average ..	—	—	663·2	3·88	407·6	3·57
Difference ..	—	—	—	—	255·6	·31
					663·2	3·88

The number of cows on which the above table is based is sufficiently large to give results which may be relied on with some confidence, there being 267 cows in each set of animals. It is also worthy of notice that the results of each year almost exactly correspond with those of the previous one, notwithstanding the fact that both the cows and districts were different almost every year. Owing to the uniformity of the results, they are therefore likely to be general in their application.

Besides estimating the quantity and quality of milk yielded by each cow, there are other purposes which milk records serve which from the economic point of view are of equal importance with the main purpose for which they were instituted. The principal of these is the amount of food consumed by each herd compared with the milk produced. In Denmark, Sweden, and Norway, it is considered that farmers are obtaining as great benefits from this section of the work as from that of recording the weight of milk and per cent. of fat. In the Scottish Milk Record Societies much the same advantage is being obtained, particularly in those districts where milk is produced all the year round, and where purchased foods are largely used. In every Society the experts enter on the sheets in daily use in the byres the weight of each kind of food given to the cows. In summer a note is made of the area of pasture consumed solely by cows in milk, and of what feeding stuffs, home-grown or purchased, are fed to them when on the pasture. The rent paid for that pasture is also noted, and farms in the hands of occupying owners are excluded, so that these returns furnish an amount of information on a question which has hitherto received little attention, and regarding which comparatively little is known.

In all countries where milk records have taken a firm hold, the question of cost in the production of milk is being forced on producers in a way it has never been before. Not only is that the case here, but it is much the same in Scandinavia, in Ireland, in the United States, and in Canada. All these countries are working out the problem in their own way and for their own conditions, and a few years hence it is expected that we will have much definite information in regard to cost of production, about which at present little information is obtainable.

In the years for which the returns are available, it is clearly shown that at the present rent of land, and value of milk, no food is so cheap as pasture. It does not seem to make very much difference whether the pasture is good, average, or inferior; provided there is plenty of it, it is almost certain to produce cheaper food than anything else. Another fact brought out is the uniformity of the cost of grazing a cow, in spite of the great difference in the quality of the pastures. The returns were drawn from a very wide area, and with the exception of a few farms lying close to good markets, the rents of the others are presumed to have been fixed

in proportion to the commercial value of the land, combined with its distance from the large consuming centres. In each of the different districts the cost of grazing varies very little, although each differs more or less from its neighbour, the cost diminishing as the distance increases from the large cities. In some of the districts the rent of land sufficient to keep a cow during the summer months is as low as 35s., from which it gradually rises in others to nearly 60s. In all the districts where the milk is largely devoted to cheese-making, the cost of grazing stated per cow varies within very narrow limits. In some of the districts considerable quantities of concentrated foods are constantly consumed on the pastures. In some of the districts these amount to £1 and over per cow. It is in the highest rented districts that cakes and meals are most largely used during summer, and their use materially increases the cost of keeping the cows in these districts, and the number of cows on a farm is no guarantee of what the rent of the farm is.

While the cost of keeping a cow is almost uniform for every district, in each of these the herds vary among themselves to a much greater extent than is generally known, when the cost of production per gallon of milk is considered. In the returns referred to, the total cost of grazing, plus the cost of extra food consumed, was divided by the total milk produced by each herd between the date of going to pasture and 11th November. For the most remote districts the average cost for food works out at from 1·1d. to 1·25d. per gallon of 10 lbs. of milk produced, while for those nearer the consuming centres it amounts to from 1·8d. to 1·9d. per gallon. Some of the herds produce so much more milk than others, on almost the same quantity and quality of food, that the cost for food per gallon of milk is very much reduced. In some cases the stock are much more economically fed than in others, and in not a few the management seems to be superior to that of the average. These all tell in the cost, with the result that we find herds grazing on almost similar land, and separated only by a fence or public road, producing milk at from ¼d. to ½d. per gallon less for food than their neighbour. These are the cases where superior cows and better management show to most advantage, and although all will never be able to produce at the cheapest rate, it seems as if it would not be difficult for many of these to save at least ¼d. a gallon in the cost of production.

The same variation which is found to exist between the various herds of each district, in connection with the cost of producing a gallon of milk from pasture, is even more noticeable during the winter months. All the home-grown foods were given a stated value, according to district and quality, and the experts weighed what was consumed of each at every visit made to each farm. The cakes and meals used daily are also weighed, and the quantity and cost per day calculated for each animal. In this way it is easy to find out daily how much food is being consumed to produce each

gallon of milk. The cost was worked out collectively for the seasons 1905, 1906, and 1907, from the New Year to the time the cows went out to grass, and comes out at 4·36d. per gallon of milk. For the same period during 1908 the cost for food works out at 4·30d. per gallon for 13 societies, with from 350 to 600 cows each. In these estimates no account is taken of the cost of providing the cows with food during the interval when they are giving little or no milk. That is an item which has to be added to the cost for food of both winter and summer milk, and is likely to be greater in the case of the latter than the former. One point deserving attention is, that as far as these districts and herds are concerned, the winter cost for food is about 3d. per gallon more for food alone, than it is in summer, when the cows are fed almost wholely on pasture.

There is another section of this question which has received far less attention than it deserves, viz., the net profit remaining after all expenses are paid of a good milking cow compared with a less useful one. While heavy milking cows consume somewhat more food than those yielding a smaller quantity, the amount is not, as is generally supposed, in direct proportion to the milk produced. Take as an example two cows, both of the same value and calving at the same time, one of which produces only 500 gallons, while the other gives 700. If we presume that both have calved just before the grass comes, and that during their lactation they have consumed pasture and other food to the value of £4 each, the probability is that the one will consume about as much food as the other, but the value of the milk of the better milking cow, at 6d. per gallon, will amount to £5 more than the other. At the extreme the heavier milking cow will not have consumed over £1 more food than the other. The poorer one of the two may have left no profit at all, and if we presume that the value of her milk just balances the expenses, then the other one will have left a profit of £4. There are large numbers of cows giving not only 700 gallons per annum, but 800, 1,000, and even a considerable number up to 1,200 and over. The cost of housing and attending a 700-gallon cow is the same as one yielding 600 gallons, while the profit from one of the former will be equal to two of the latter, and at the same time the cost of attendance on, and food of, one cow will be saved. A farmer owning 20 cows, yielding 800 to 1,000 gallons, would make as much clear profit from them as if he had about 100 yielding on 500 to 600 gallons each, while the expense saved in food and attendance would be enormous. Such cases are not at all rare, absurd, or visionary, but are an every-day experience in the history of milk records in every country which has adopted them.

Milk records as now conducted in the most advanced districts are simply a perfected system of dairy book-keeping, in which by simple, accurate, and easy methods a ledger account is kept with each cow on exactly the same principle as is followed in every business doing a credit trade. No ordinary business man would

think of doing otherwise, as if he did his career would soon come to an end. All cows do not give back in milk, any more than all customers in cash, sufficient to pay for the food or goods supplied to them, and yet leave a margin for tear and wear and profit. For the merchant to allow his customers to take away as much as they liked without keeping any account of it, and to pay back anything they liked without a correct statement being kept, would be considered the height of folly, yet it is exactly what everyone who keeps cows has been doing. The majority have done so because no clear road was shown how to do otherwise, and what could not be cured had to be endured. Now, however, matters are much improved, and milk producers need not keep cows which do not yield sufficient milk to pay not only for their food and attendance, but something to help to keep their owner. The cows should keep the owner, not the owner the cows, as in too many instances is the case. Few milk producers admit that they keep cows for amusement, but the milk records of every district and every country clearly prove that the number of cows which die in debt to their owners is greatly in excess of what had previously been supposed.

The gain to be obtained in every herd by the simple process of eliminating the unprofitable cows is much more than sufficient to pay for the whole cost. It is, however, small compared with the gain which the breeder obtains who goes about his work methodically. Numerous instances are recorded every now and again, both in this country and abroad, where the gains obtained have been great, but yet in nearly every case they might have been greater had the work been properly gone about. It now seems as if no characteristic of the cow was so strongly hereditary as the tendency to give milk, and if breeders could only make up their minds to get rid of their poor milkers, the average produce of our cows might be enormously increased. Denmark is presumed to have doubled the produce of her cows during the last 24 or 25 years, first by private milk records, but latterly mainly by milk record societies, of which there are about 500.

One instance from Sweden may be mentioned as indicating the lines along which improvement is most certain. August Kink, of Sweden, had what was generally acknowledged to be a superior herd, and of which he was very proud. He joined a milk record society in 1900, and his 70 cows had an average yield for that year of 7,320 lbs. each, say, 732 gallons, which many people would think left little room for improvement. He however thought otherwise, and as soon as possible he so d 42 of his herd and retained 28. With these and the heifers from them, in the following year he had 46 cows and heifers, the year after 61, the next 64, and the one following a full herd of 71, which that year yielded an average of 11,330 lbs. per cow, or a gain in six years of 400 gallons per cow.

The gain obtained by Mr. Kink does not end by an increase in the yield of his cows from 732 gallons of 10 lbs. to 1,133, because

the value of these animals from the breeder's point of view is very great. It is not yet known what may be called the limit of production, but numerous well-authenticated instances seem to point to a yield very much greater than that, so that there is a probability that this herd will do still better in the years to come.

The majority of milk producers have formed the opinion that while breeding in a certain line may increase the quantity, any improvement in the quality can only be obtained by feeding. Such an idea is quite erroneous, although some colour has been given to the opinion by the fact that the percentage of fat in the milk of the cows of Denmark is very little over what it was when testing began. In Holland, where this work started a few years later than in Denmark, but where greater care and attention has probably been given to the breeding and milking qualities of the cows than in any other country, a material improvement has been made on one herd of pure bred Dutch cattle. Mr. Kuperus, Marssum, Leeuwarden, has a stock of 35 cows, which in the first eight years of testing was raised from the ordinary Friesland average to that of milk from Shorthorns or Ayrshires. The average for each year was as follows :—

1897 = 3·15 per cent. of fat.
1898 = 3·28 ,, ,,
1899 = 3·39 ,, ,,
1900 = 3·46 ,, ,,
1901 = 3·47 ,, ,,
1902 = 3·44 ,, ,,
1903 = 3·50 ,, ,,
1904 = 3·52 ,, ,,

In quality as well as quantity there must be a limit somewhere, but for this herd it does not seem as if it had been as yet reached, and what has been done by one breeder may be done by others.

The Council desire to express here their deep regret at the great loss which the British Dairy Farmers' Association and the dairy industry generally have sustained through the sudden decease of the author, Mr. John Speir, within a few days of writing the foregoing article for this Journal.

AYRSHIRE CATTLE MILK RECORDS COMMITTEE OF SCOTLAND.

(Referred to in the foregoing Article.)

INSTRUCTIONS TO EXPERTS IN THE CHARGE OF STATIONS RECEIVING GRANTS IN AID.

The Experts are requested to make themselves familiar with these Instructions, and to follow them out with the utmost care.

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1. The Gerber or other machine for testing the milk, and the other necessary apparatus for weighing it, etc., are fitted into a box which likewise contains bottles to hold sufficient acid and alcohol, or sal and butyl, to serve for a week or two, according to the number of cows to be tested. One or more carboys of acid, and a corresponding number of jars of alcohol, or a supply of sal and butyl, should be provided by the Local Secretary. The acid and alcohol should be left at any farm or farms convenient for refilling the bottles. The sal and butyl may be carried about without any difficulty.

2. Care should be taken to have the acid carboys tightly corked, as if air comes in contact with the acid the latter becomes weaker and less reliable for testing purposes. Some luting is usually sent out with each carboy. This should be carefully preserved, and replaced round the stopper each time the carboy is opened. If this is lost or destroyed, fine clay may be used instead, or if a rubber cork is available, it may be used; but ordinary corks, unless covered with rubber, are not suitable. Should the acid become at any time a trifle weak, a little more may with advantage be used at each test.

3. Sheets are provided for use when the milk is being weighed, also books for each farm, into which the full details for each cow are to be entered as soon as the day's testing is completed. One book or two as required, according to the size of the stock, should be left at each farm. *The farmer must fill in the pedigree and particulars of each cow, including the registered number where entered in Herd Book, and the Expert those relating to the milk.*

4. Two copies are to be made of the Byre Sheet. For this purpose carbon paper has to be obtained, so that by putting a sheet of it between two of the ordinary Byre Sheets a duplicate copy can

be made without any extra trouble. In doing so, carefully fix the Byre Sheets on the board provided for the purpose, by inserting a drawing-pin in each corner.

5. In filling in the details of the Byre Sheet use a hard pencil of good quality. Have it carefully sharpened each night before beginning, as this materially assists in giving a distinct copy on the duplicate sheet.

6. On every occasion note exactly the hour at which milking begins. The Expert should do the weighing of the milk as near to the milkers as possible, so as at all times to have them in full view, and where practicable should receive the milk direct from the milkers at the cow's side.

7. If a cow is visibly unwell or the milk has been spilled, or if for any other reason the actual weight, or an average sample cannot be obtained, leave the space blank in the meantime, but on the next visit find the mean between that date and the one last recorded, and enter it in the space previously left blank. Put opposite every entry of this kind the word "estimated," and the reason why such was necessary. In the event of a cow aborting, said cow must be treated as having entered on a new period of lactation. Where in a one day test the number of cows in a herd does not exceed 50, all the cows in the herd must be tested. Where two consecutive days are taken to the test, all the cows in the herd up to 100 must be tested. Where in a one day or two day test the cows in the herd exceed 50 and 100 respectively, a note of the cows giving milk, but not being tested, should be taken by the Expert, and the testing thereafter should be strictly confined to the cows set aside by the owner at the commencement for the purposes of the test.

8. If the herd is under 25 cows the milk of each cow should be tested separately both night and morning, and entered in the columns of the Byre Sheet provided for the purpose. If the herd is over 25 in number this need not be done. It will suffice to take a mixed sample of the evening and morning milk of each cow, and test the mixed sample only. (See Article 11.)

9. In all herds a mixed or composite sample of the milk of the whole herd should be taken each evening and morning. In order to do this there should be in readiness a large jug, basin, or bucket, into which should be put a small quantity of the milk of each cow at the same time as this milk is being put into the sample bottle. The quantity put into this vessel should bear a fixed relation to the yields of the different cows for the time being. Thus, if a certain measure is put in for, say, a cow which gives 15 lbs., only a third of that quantity should be used for one giving 5 lbs.

10. Never take a sample, even of new milk, without emptying it once or twice from one vessel into another, and for this purpose always have at hand an extra bucket or milking cog. Draw the sample as soon as possible after the mixing is done, and if the milk is cold on no account allow even a moment to elapse between the mixing and the drawing of the sample, otherwise it will rarely be a reliable one.

11. When milking is finished, the contents of the vessel, into which a small portion of the milk of each cow has been put, should now be thoroughly mixed by pouring it several times from one vessel to another, and a sample at once drawn. This sample should be put into a bottle and tested in the usual way at the ordinary time, the remainder of the milk in the vessel being sent to the dairy. This sample is called the composite evening or morning sample. It is a fair average of the mixed milk of that particular milking, but it is seldom a true average. It is, however, a very good check, as it indicates whether or not any error has occurred in working out the true average, which is obtained later on by calculation.

12. Where there is a sufficient number of sample bottles, and the number of cows is not large, one bottle may be used for the milk of the evening and another for the milk of the morning of each cow. If, however, this is not quite convenient, one bottle will suffice. Let it only be half filled in the evening, so as to leave sufficient room to hold the sample of the milk of the morning.

13. If at all possible, try to find a place for testing the milk away from where the ordinary supply is stored. When emptying the sample bottles so as to draw a measured sample, first shake the bottle well, so as to break up the cream adhering to the sides of the bottle, then empty the contents into a cup or tumbler, and thoroughly mix before drawing a sample. After testing, always keep the testing bottles in warm water, or in a warm place, till the per cent. of fat has been noted and all are ready to be emptied. When emptying them take the bottles outside, and, if possible, pour the contents into a drain or sink at some distance from the dwelling-house or dairy. In doing so, keep turning the bottles round between the fingers, so that the acid and liquid may wash out any fat adhering to the sides of the tube.

14. After the weight of milk for both the evening and morning has been entered on the Byre Sheet, fill up the total column. Enter in the per cent. of fat as you read it off the bottle, but in doing so never fill in the amount till you have looked at it a second time, as it is a very simple matter to make a mistake in reading off the figures. If there is any cloudiness in the fat, or the margin between the fat and the liquid is not distinct, always repeat the test.

15. In order to get the average, sum up the weight of milk in the three first columns, and divide the totals of each by the number of cows in milk. Add up the 1 per cent. column, and divide the sum of it by the total weight of milk. This will give the true per cent. of fat in the mixed milk of the herd.

16. Enter the above results at the end as follows :—

Total Number of Cows in Milk	Milk			Fat		
	Evening	Morning	Total lbs.	Evening	Morning	Average
30	..	..	..	3·5	3·5	3·5
Average	15	15	30	..	..	3·5

17. In folding up the Byre Sheets, keep the written sheets and the duplicates separate. Spread out the sheets belonging to each farm for each round separately, with the written side, earliest date, undermost, then put on the top each date in succession. When all are placed in position close the sheets like a book, the earliest date being on the top or in the centre. This materially assists in checking. Leave the duplicate sheets with the Local Secretary, and forward the others periodically to whoever is to report on the results. In forwarding the sheets to the Committee keep them quite flat, as when rolled up or folded they do not pack away so well afterwards, and when in any shape other than quite flat they are difficult to check, or to collect any details from.

18. A cow's period of lactation may extend from last year into this year. Where this happens, and if the herd was tested last year, bring forward the yield of this cow from the previous year, putting the totals on the first line of the new book. Enter as "Brought forward" in the date column, as shown in specimen table attached to paragraph 20.

19. At the first visit to each farm, after weighing and testing the milk, enter in the proper column the number of lbs. of milk of 1 per cent. of fat (which is the total weight of milk multiplied by the percentage of fat in the milk), using decimals only, then multiply this sum by the number of days which have elapsed since the cow calved, and enter in the period column. If the period which has elapsed since the cow calved is greater than that between the visits of the Expert, any number of days may be used up to thirty, but not beyond. The Milk Fat Reckoner should be used for this purpose, as it insures both speed and accuracy.

20. On the second and succeeding visits, after multiplying the lbs. of milk of 1 per cent. of fat by the number of days which have

elapsed since the last visit, add the two together and enter the amount below *in pencil*, thus :—

Date from and to	Milk in lbs. Daily	Milk in Gallons for .... Days	Per cent. of Fat	Lbs. of Milk of 1 Per Cent. Fat for 1 Day	Lbs. of Milk of 1 Per Cent. Fat for .... Days
Brought forward	50·0	105·0 – ink	3·5	150·0	1100·0 . . ink
March 1	30·0	63·8 – ink 168·0 – pencil	3·5	105·0	1470·0 . . ink 2570·0 . . pencil
March 15	35·0	. .	3·4	119·0	1666·0 . . ink 4236·0 . . pencil
March 29	40·0	. .	3·3	132·0	1848·0 . . ink 6184·0 . . pencil

Make the pencil figures as small and distinct as possible, so as to get two rows into one space. Do the 1 per cent. columns for the period in the same way. On each succeeding visit do the same. In this way each cow's produce is always summed up to date. This gives the owner a greater interest in the results, while the accountant has only to add up the different columns to see if they agree with the Expert's figures in pencil, instead of going over each calculation twice.

21. Make at each visit as near an estimate as possible of the total food of all kinds given to each cow per day. The method adopted may have to be varied according to circumstances. It may be done by either weighing what is given to a single cow or a number of cows. The greater the number of weighings, the more accurate will the estimate likely be.

State the weight of each kind of food used per cow per day in the following manner :—

Say	Bean meal	5 lb.
	Pea meal	3 ,,
	Treacle.	1 ,,
	Turnips	56 ,,
	Hay	12 ,,
	Straw, including chaff	5 ,,

22. In the column for "Remarks," enter anything peculiar to the cow, such as sick, aborted, bulling, date when cows go to grass, &c.

23. If there are any unusual conditions in the weather, such as rapid changes from heat to cold, or the reverse, pay particular attention to what effect, if any, these may have on the quantity and quality of milk, and when you think such deserves attention make an extra note of it on the margin of the Byre Sheet.

24. Make all the figures as plain and distinct as possible, and take special care to have the decimals under the decimals, and the

units and tens under each other. Units under the decimals, and tens under the units, greatly increase the labour of adding them up, and make correct summing extremely difficult.

25. If a figure has been made in error either by pencil or pen do not put another figure on the top of it, as the figure inserted can rarely be distinguished from the other after an interval of several weeks or months. When this happens, draw the pen through the figure which has been made in error and put the correct figure above or below.

26. On the last circuit collect all the farm books, and forward these along with the written Byre Sheets to the proper quarter. Before taking the books from the farm see that all are properly filled up. If the herd has been previously tested, insert in the book the year or years of former test or tests, also enter the number or numbers by which each cow formerly tested was distinguished in each year.

27. Before returning the farm books each Expert should calculate what is the average per centage of fat in the milk of the whole lactation, or the part of it which has been recorded. This is found by dividing the number of lbs. of milk of 1 per cent. fat by the total number of lbs. of milk. The gallon is to be reckoned as 10 lbs. When the quantity of milk and per centage of fat have been found, enter them in the space provided for them. Where there are two sets of entries, those for the incompleted lactation should be put in the ordinary columns in red ink.

28. Experts should see, early in the season, that the age, dates of calving, and of service of the cows are all entered in as soon as known, as many of the books are annually returned without these being filled in. Any omission to fill in these details causes trouble in the summarising of the results, and may debar an animal and its descendants from entry in the Herd Book.

29. All letters in connection with the Milk Records, and all orders for acid, alcohol, sal, &c., should be copied in a book supplied for the purpose. No letter, no matter how trifling, is to be sent away without a copy being retained; the want of such has repeatedly led to serious loss and inconvenience. When the Expert leaves, this book is to be given up to the local Secretary.

30. The Local Society and owners of herds tested are required to afford every facility to the Expert for the carrying through of the tests in accordance with the above instructions. Any failure to afford the necessary facilities, or any obstruction of the work on the part of Local Societies or owners of herds, should at once be reported to the Secretary of this Committee.

FACTS ABOUT SOME VARIETIES OF CHEESE.

By Professor James Long, Pembroke Lodge, Redhill.

The most important varieties of foreign cheese—and we may place them in what we believe to be the order of their merit—are, among the pressed varieties, the Gruyère; the Gouda, or flat, and the Edam, or round, cheeses of Holland; the Cantal, which is a large cheese weighing from 45lb. to 130lb., made in the mountains of Auvergne; and the Parmesan, the national cheese of Italy, the last-named being the production of milk which is practically skimmed. Among the partially pressed cheeses are the Port du Salut, the original production of the Trappist monks in France; the Gorgonzola, a blue-veined cheese of Italy; the Roquefort, also blue-veined, and made in France in its pure state from sheeps' milk, although it is now largely made from the milk of the cow; and the Gex, another blue-veined cheese, made in the Department of Ain, in France. Lastly, we have the soft cheeses, which are entirely unpressed, and which are chiefly made in France; indeed, we know of no other soft varieties worthy of the name of fine cheese which are made either in this country or on the Continent of Europe. It is indeed a strange fact that neither Belgium, Germany, Austria, the countries of the Peninsular, nor Scandinavia, produce a single type of cheese of first class, whether pressed, partially pressed, or entirely soft, which rises at all above the extremely common order. The chief French soft cheeses, then, are the Brie, the Camembert, the Pont l'Evêque, the Neufchâtel, the Geromé, the Mont d'Or, and the imitation cream, which is known by the name of the two great makers Gervais and Pommel. We may add, perhaps, that a variety made in the North of France, and known as the Livarot, is extremely popular with the working classes, and sold very largely, although it is practically a skim-milk cheese, and cannot therefore be included among varieties of high type.

In the manufacture of a pressed cheese the milk is usually brought to a fairly high temperature, varying from 80 to 95 deg. F., at which temperature the Gruyère and the Gouda of Holland are most frequently produced. The curd, having been set sufficiently for cutting or breaking down, is in the case of the best makers cut into cubes and left floating in the whey, in which it is gently moved until the whey has been expelled and each cube of curd has shrunk and become partially solid. Care is always taken to treat the curd with extreme delicacy in handling, in order to prevent the escape of fat, and in consequence the impoverishment or leanness of the cheese. The whey having been drawn off or removed while in its green condition, the curd is subsequently handled with a view of inducing it to mature sufficiently, and in order that a flavour and

aroma of a delicate and pleasing character may be produced. It is worthy of remark in passing that a portion of the fat, as of the casein and the albumen of the milk, is lost in the process of making cheese, the portions lost passing into the whey. In some instances the fat is removed by skimming, while it is occasionally extracted by mechanical separation and converted into butter. It is the loss of these materials and their presence in the whey which gives it to a large extent its feeding value, although it may be added that the chief constituent of whey is the sugar, almost all of which passes into it from the curd.

On the basis of observations made in the manufacture of Cheddar cheese, it has been shown that the quantity of fat lost under good conditions per 100lb. of milk varies from ·4 per cent. in April, May, and September to ·33 per cent. in June, July, and August, although it sometimes happens that the loss is not so great in the three first months which have been named. At all events, the loss is smallest in the month of June. This loss, however, may be enormously increased by bad workmanship, and has been known to reach as much as 10 per cent.; but where rich milk has been employed, as in the case of the experiment at the Geneva Station in the State of New York, it fell as low as 6·3 per cent. It is, indeed, generally found that the richer the milk the smaller is the loss of fat, and that the temperature of the air has a great deal to do with the loss per cent. The quantity of casein and albumen lost and passing into the whey varies from ·64 to ·85 per cent., the greatest loss being in October and June, and the smallest loss in April. Practically speaking, the recovery of the fat of milk in the manufacture of pressed cheese reaches 90 per cent., milk of an average quality being used, while the recovery of the casein and the albumen reaches nearly 76 per cent. Again, if we deal with the total solids of the milk we find that the quantity of milk solids in the whey is almost equivalent to the solids retained in the cheese, except in the month of April at the commencement of the season. During the later months, especially in September and October, the whey and solids recovered from the milk in making the cheese are slightly higher than the weight of solids which pass into the whey. There is no doubt of one fact, that just as the quantity of cheese produced from rich milk increases with the fat percentage, so the quantity of fat lost in the whey decreases with the fat percentage. The cheese produced from poor milk—that containing 3 per cent. of fat or thereabouts—scarcely ever reaches a pound per 10 gallons, or 100lb. of milk; but where milk contains 5 per cent. of fat, or slightly more, the quantity of cheese produced per 100lb. of milk will reach from 13lb. to 13½lb.

We next come to the principles which lie at the basis of the production of soft cheese. In making hard or pressed cheese, as will have been observed from the remarks which have been already made, the curd is extracted in small pieces in a comparatively firm

condition from the whey soon after coagulation, its division into pieces being the result of cutting. On the most modern system, two forms of knives are used: one with a number of vertical blades, which cut the curd in the square vat into long, rectangular strips; the other with horizontal blades, which divide the strips into cubes, so that by contraction, as the whey is expelled, small pieces are formed, which somewhat resemble coarsely-chopped suet in their form. In making soft cheese there is no cutting beyond that essential in the removal of the curd in slices, which is the practice in most cases, either into cloths or into moulds. We take an example in the Camembert, in which the moulds are cylinders of tinned iron. These are gradually filled with thin slices of curd which remain in the moulds upon a clean mat of straw. The most important element in drainage, next to the condition of the curd, is the temperature of the apartment in which the work takes place. If this is approximately correct, the whey is induced to flow from the curd until the latter gradually assumes a more or less firm condition, when, by deftly placing the hand at the bottom of the mould and reversing it, drainage is induced from the softer curd at the top. If the temperature is too low drainage is deferred, the whey leaving the curd much too slowly, a large proportion never leaving it at all, with the result that too large a quantity of sugar, which is the chief solid of the whey, remains in the curd and is followed by imperfect fermentation and the consequent spoilation of the cheese. This is practically what follows in the manufacture of Stilton, where, owing to the imperfection of the curd or to a low temperature, the whey fails to leave it with sufficient freedom, with the result that the cheese swells and becomes unfit for sale, in spite of the attempts of the maker to induce further drainage by the insertion of skewers in the holes which surround the moulds or cylinders in which the curd is placed. On the other hand, where the temperature of the making room is too high the whey from the curd intended for making Camembert cheese drains too freely and in too large a quantity, again with the result that the cheese is spoiled, the curd becoming too dry and the fermentation being in consequence imperfect. To obtain soft cheese of the finest type it is essential that the curd should contain a sufficient quantity of moisture in the form of whey. It is by the aid of this moisture and the activity of the bacteria present that the insoluble curd is converted into soluble cheese of a creamy, unctuous, and mellow consistency, this consistency being accompanied by the essential flavour which is developed by the action of the bacteria. As in the case of veined or blue-moulded cheeses, the introduction of foreign bacteria—especially those which invariably find their way upon unclean utensils and which are present in unclean milk—is followed by bad flavour and consistency, while in addition a veined cheese like the Stilton develops patches of a reddish form of decomposition, bitterness of flavour, and in some instances a tallow-like

taste on the palate. Cheese of this kind is often chippy and hard, instead of being soft and creamy, while the blue portion of the cheese is but slightly developed, and that only in the centre.

Again, it may be pointed out that in the leading types of soft cheese, moulds or fungi play a large part in the ripening process, these moulds growing on the crust, but only growing freely where it has been salted. It is therefore important that a maker should take the greatest care that every portion of the surface of a cheese, whether Camembert, Brie, Coulommiers, Neufchâtel, or kindred varieties, is salted freely with the finest salt which can be obtained, and which has been dried by heat and pulverised as finely as possible. It is a common practice to distribute salt by the aid of a feather, but the first form of distribution should, in the judgment of the writer, be performed by the aid of a fine dredger, by means of which the tiny grains of salt will be distributed on every portion of the crust, especially the sides, which are often imperfectly covered.

When the cheese is placed in the drying-room it is gradually covered by small button-like clumps of a white form of fungi, this gradually extending until the whole surface is covered with what resembles a white velvet pile. Subsequently a blue mould appears amongst the white, this gradually covering the cheese in the same way. As every cheese is turned daily, or thereabouts, until ripening is complete, the mould on the surface next to the shelf is crushed by the pressure of the cheese, with the result that the mingling of the white with the blue gives a greyish appearance to the crust, which somewhat resembles that on the surface of a hard cheese in the shade of its colour. It has long been the practice of some cheese makers of the North of France to inoculate the drying and ripening rooms with the mould obtained from a successful cheese dairy, the walls being washed, as it were, with water obtained from a washing supplied by the dairy in question; but in practice this is unnecessary, unless by some mischance an imperfect form of mould grows upon the cheese, especially that of a type which is black. In the case of the Brie, an additional variety of fungi is believed to add to the fragrance and flavour of the cheese, this being a red mould, which was originally taken by a famous maker in the Brie district from a vessel upon which the drippings of a beer cask had fallen. But in our experience in the Paris Halles the best type of Brie is covered with mould which resembles that of the Camembert —a white which is followed by blue.

The ripening of the soft cheese commences from the outside, and is not complete until it has reached the centre. If a half-ripe cheese is cut it will be found that about one-quarter of the surface of the interior, both top and bottom, is creamy, mellow, and completely ripe; while the remaining portion between these two layers, which practically speaking is the interior, is still insoluble, and in consequence in an unripe condition. The cheese is therefore left until the ripening process has extended and is entirely complete.

when it is sent to market; but care must be taken that it is not kept too late, or the outsides will be over-ripe and become too liquid, with the result that the crust will break and the cheese will run. Although in France such cheese is saleable, it realises a smaller price, for it is by no means so fragrant nor so tasty. Its smell is too strong for the educated palate, although the flavour, like the strong cheese of other types, appeals more completely to the working classes, who are thus enabled, as it were, to make a smaller piece of cheese go further with their bread, for which reason German workmen consume large quantities of Limburg, and the French similarly large quantities of Livarot, both of which are pungent to the nose and palate.

In practice there are two types of all the leading soft varieties of cheese in France—one in which the milk is set just as it comes from the cow, the other in which a portion of the cream is removed by separation. When on one occasion the writer conducted a small party of the members of the British Dairy Farmers' Association, after the Conference in Jersey, to see something of Norman dairying, and an important factory was visited from whence large quantities of cheese are sent to England, the unexpected happened. We arrived at a moment, meeting the proprietor by accident in the train, when the milk was being passed through the separator, and some of our party were not a little surprised to find this machine in such a building. Camembert cheese intended for the English market is, therefore, in this case at least, the production of partially skimmed milk, and in consequence it is not so rich, although it realises much too high a price. The leading private makers, most of whom reside in the Department of Calvados, do not, however, skim their milk. Depending as they do upon Paris prices, they send to the Halles, or market, the best they can produce from the richest milk at their command. The milk of the Norman cow, which is generally used for the purpose, is practically similar in character and richness to that of the English Dairy Shorthorn, to which it bears some resemblance in size and form, and in deep milking power. It is therefore possible for an owner of a useful herd to make a large quantity of cheese, and it is by no means uncommon to find —and we speak from experience—something like 10,000 cheeses at one time in a single dairy of a private owner.

We believe there are differences of opinion with regard to the character of a cheese when produced from rich milk than that which is used in the ordinary way, but we cannot doubt that, as in the case of Stilton and pressed cheese of the leading types, not only is there a larger quantity of cheese produced from milk of the richest character, and a smaller quantity of the solids, and especially the fat, left in the whey, but the quality of the cheese which results from its employment is distinctly improved. It is sometimes supposed that among the leading types of French soft cheese some are made entirely of cream; but this is a mistake.

Not even the rich cheese of Gervais and Pommel is made of this costly material. This variety, which is made by the two mentioned manufacturers at Gournay, to both of whom we have paid a visit, is the result of a blend of cream and new milk—the latter largely preponderating—the mixture being set at a very low temperature and maintained in a creamy or mellow condition by the slow drainage of the whey, care being taken—and this is highly important—to prevent the formation of particles of curd, which may easily follow where manipulation is careless or inexact.

The Camembert is set with rennet at 80 deg. F. in the usual way, although there are variations in this as in every variety, in accordance with the practice of the maker and with the temperature of the air. The curd is brought in two hours, while the cheese takes some six weeks to ripen. Each cheese weighs from 11 to 12 oz., and requires in its production 4½lb. of milk or thereabouts.

The Brie, which is set at 82 to 86 deg. F., is made from curd which is coagulated in from two to four hours. It is ripened in three stages, at 61, 63, and 65 deg. F. Less rich than the Camembert, it contains one-half its weight of water, about 17 per cent. of casein, and 25 per cent. of fat, whereas the Camembert contains 30 per cent. each of fat and casein. The lactic acid of the curd is attacked by a fungus known as Pencillium album, which it removes, leaving the curd in an alkaline condition, but a check must be placed upon its too full development. Where this development occurs there is likely to be too great a development of the blue mould, and even of the black mould, which is dangerous to the cheese; this is prevented by extra turning and a reduction in the temperature.

The Pont l'Evêque cheese, which is of a firmer character, is allowed to drain in cloths before being placed in the mould, when the curd is drier. The milk is set at a higher temperature—88 deg. F.—and the curd is brought in 15 minutes. The ripening stages are conducted at 63, 58, and 56 deg. F. The Pont l'Evêque almost resembles a pressed cheese, owing to its tougher character; nevertheless, it is mellow on the palate and of delightful flavour, but there is rather too much crust.

The Mont d'Or, once made of goats' milk, is now produced from the milk of cows, skim milk being added to the new at 90 deg. in most cases, although the best cheese is made from new milk set at 85 deg. F. The milk is set in lots of about 5 quarts each, coagulation taking place in 2 to 2½ hours, when the curd is cut, left for some time, and then placed in moulds. The cheese is then turned every 2½ hours during the day and every 3 hours during the evening. At the end of 12 hours they are placed upon the draining shelf in an apartment at 67 deg. F. From here, in 12 hours more, they pass to the drying room and are placed on straws, being turned every three hours, when they are rubbed with a solution of sea salt. The crust of the cheese is yellow when ripe, and its character quite

creamy at the end of a week in summer. The Mont d'Or cheese weighs about 5 oz., and is now very largely made.

The Neufchâtel cheese, which contains 33 per cent. of fat and 15 per cent. of casein, is a small loaf cheese, blue inside when ripe, and resembling a miniature Stilton. One pound of milk makes one cheese. The milk is renneted at 90 deg. F., and is coagulated in 24 hours. The temperature of the milk room should be from 60 to 62 deg.; here the milk is set in pans, each holding about 5 gallons. There are some makers who produce Neufchâtel by bringing the curd in 45 minutes, setting the milk at a lower temperature, and placing the curd in a cloth for 12 hours, after which it passes into a frame of wicker-work, where it is pressed by a weight being placed upon a board which lies upon the curd for 12 hours. When the curd is fit for moulding—it should be creamy in consistency—it is worked by the hand and placed in small cylinders about 5½ by 6½ centimeters in length. After draining for 24 hours, it is taken to the drying room and placed on dry, clean straw, where it remains from two to three weeks, after which it goes to the ripening room, commencing to take the blue at the end of five weeks, being turned twice weekly. A ripe cheese weighs about 4 oz. The price realised in France is about 12s. per hundred.

The Gervais, contrary to general belief, is not only made from a mixture of milk and cream, but contains more than half its weight of water. It is less rich than the Neufchâtel, although of similar shape, containing 30 per cent. of fat and only some 12 per cent. of casein. It is set at a low temperature—about 65 deg. F.—the mixture of milk and cream coagulating in from 8 to 12 hours.

The Port du Salut, which somewhat resembles the Caerphilly of the South of Wales, is termed in France a "cooked" cheese, being produced from milk set at 82 to 85 deg., the curd being brought in 30 minutes, and subsequently heated up to from 91 to 95 deg. F. The curd is slowly cut with an implement on which are strung several wires, or with a long knife, and is divided into grains by being subsequently cut horizontally. After the second heating the curd is worked until the grain is about the size of wheat, when it is left to settle; the whey is then drawn off and the curd placed in the moulds, which are 11 inches in diameter by 3 inches high, and placed on boards made of beechwood, on which a cloth is laid. It requires 2¼ gallons of milk to produce a single cheese when ripe, although when green the weight is more than double. Pressure is very slight, a board being placed upon the cheese with a weight of 10lb. to 11lb. upon it, which remains for six hours, when the pressure is gradually increased at each of three changes of the cloth up to 30lb. Where the Port du Salut is made upon a larger scale special presses are employed. The cheese is next taken to the drying room and salted at the end of 12 hours, the temperature being about 60 deg. F., while the quantity of salt employed is about 2 per cent., care being taken in this operation to keep the curd as

soft as possible. After the final salting the crust is thin, and on leaving the drying room the cheese is taken to the "cave" to ripen at a temperature of 54 deg. F., remaining there some five weeks, being rubbed every day or two with tepid salt water, this rubbing being later on deferred to every four days, and subsequently to every eight days.

The Parmesan, which is made in Parma and Emilia, is made from the milk of the preceding night which is skimmed in the morning, when the morning's milk is added after skimming. The vat used for settling is of copper, about 3 feet in diameter, and holds some 12 gallons of milk. The temperature at which the milk is set varies from 86 deg. F. in summer to 98 deg. in winter. When the curd has been cut it is stirred in the whey, while heating over a fire, with an implement at the bottom end of which is a disc. The rennet used is the solid pulp of the stomach of the calf, about 5 grammes being used to each 10 gallons of milk, in which it is squeezed with the hand. When the grains are fine enough they are left to settle at the bottom of the vat, part of the whey being baled off. It is again heated and stirred, saffron being added, until the temperature reaches 120 deg., or sometimes higher, at which it remains for 50 minutes. It is then left to settle for 10 minutes, when the remainder of the whey is drained and the curd removed in a linen cloth which is passed beneath it, as in the case of the manufacture of Gruyère. The curd is then drawn, drained for a short time, and put into the mould, which is about 5 inches high by 19 inches diameter. The salting is a careful process, about 4 per cent. being used. When this is completed it is placed upon the ripening shelves until mature—a cheese weighing up to 200lb. Before sale the Parmesan is scraped and oiled. We have seen as many as a thousand cheeses in a single cellar. Want of space forbids reference to the Livarot, the Gex, the Roquefort, the Gorgonzola, and the Gruyère, all of which are worthy of close attention.

THE CHESHIRE DAIRY CONFERENCE.

By. J. F. Blackshaw, Principal, Midland Agricultural and Dairy College, Kingston, Derby.

The British Dairy Farmers' Association having received a hearty invitation at the hands of a Committee of Cheshire Dairy Farmers, of which Mr. George Barbour was Chairman and Mr. James Sadler Secretary, decided to make Cheshire the venue of the 1909 Conference. It was undoubtedly a very fitting decision to have made, seeing that Cheshire is essentially a dairy county, and that during the 24 years that have elapsed since the last visit of the Association to the county great advancement has been made in the dairy industry.

The Conference Committee by the aid of the Local Committee were able to draw up a most attractive programme, comprising four instructive papers, intermingled with an interesting round of visits to dairy farms and other noteworthy features of this charming county.

The following is a list of the members and delegates attending the Conference :—

Lord Belper, President; Mr. George Barbour, Bolesworth Castle, Cheshire; Mr. Harry Barnston, Farndon, Cheshire; Mr. Joseph Beecroft, Birkenhead (Cheshire Milk Producers' Association); Mr. A. Berry, Sudbury, Suffolk; Mr. Geo. J. Blackburn, Liscard, Cheshire; Mr. & Mrs. J. F. Blackshaw, Midland Agricultural and Dairy College; Mrs. J. Blackshaw, Chelford, Cheshire; Mr. Alfred Blundell, Luton, Beds.; Professor Edward Blundell, Cirencester; Mr. Frank Brindley, Congleton, Cheshire; Mr. John Brown, Tunbridge Wells, Kent; Mr. W. C. Brown, Appleby, Lincs.; Mr. D. E. Byrd, Tarporley, Cheshire; Mr. E. W. Caddick, Ross, Herefordshire; Mr. Vernon B. Chalk, Beckenham, Kent; Mr. George Cooke, Chester (National Federation of Dairymen's and Cowkeepers' Associations); Mr. & Mrs. W. P. Cowell, Saffron Walden, Essex; Mr. W. J. & Miss Cox, Cardiff; Mr. Loudon M. Douglas, Edinburgh; Mr. P. J. Edwards, Ellesmere, Salop; Mr. J. B. Ellis, St. Ives, Hunts.; Mr. James Evans, Pendleton, Manchester; Mr. John Evens, Lincoln; Mr. J. Wallace Frank, Llanymynech, Salop; Mr. George Fiske, Bramford, Suffolk; Mr. A. J. Follows, Birmingham; Miss J. Forster, Cheshire Dairy Institute, Worleston; Mr. F. H. Freeth, Watford, Herts.; Mr. Harold F. Freeth, Watford; Mr. & Mrs. Alex. Gibson, Haywards Heath, Sussex; Mr. F. W. Gilbert, Derby (Derby and District Dairymen's Association); Mr. Geo. Graham, Much Hadham, Herts.; Mr. W. J. Grant, Newport, Mon.; Mr. J. L. Green, Editor of *Rural World*; Captain C. S. Greenwood, J.P., Birstwirth, Yorks. (Harrogate and District Milk Dealers' and Cowkeepers' Association); Mr. A. Hailwood, Manchester (National Federation of Dairymen's and Cowkeepers' Associations); Mr. J. T. Harrison, Buckingham (Bucks. Dairy Farmers' Association); Mr. Joseph Hayward, Oswestry, Salop; Mr. W. H. Hobson, Nantwich, Cheshire; Mr. Reginald Hollington, Maldon, Essex; Mr. Cyril Hunt, Ipswich, Suffolk; Mr. & Mrs. Chas. Ibbott, Oakley, Beds.; Mr. Edwin B. Jay, Epsom, Surrey; Mr. William H. Key,

Leicester; Mr. James Kirby, Boreham Wood, Herts; Mr. T. J. Kitchen, Nantwich, Cheshire (Dairy Students' Union); Mr. A. O. Lakin, Whitchurch, Salop (Whitchurch Dairy Farmers' Association); Mr. Wm. Langridge, Eastbourne, Sussex; Mr. John Lee, Ellesmere, Salop; Mr. Arthur Lee, Ellesmere, Salop; Mr. Frank Lloyd, Wrexham; Mr. F. J. Lloyd, London, Consulting Chemist to the B.D.F.A.; Mr. Archd. Macneilage, Editor of *Scottish Farmer*; Mr. Robert Manley, Nantwich, Cheshire; Mr. Primrose McConnell and P. McConnell, Junr., Southminster, Essex; Mr. William Nisbet, Hinton, Cambs.; Professor Nuttall, Uttoxeter, Staffs.; Mr. Albert Palmer, Willerby, Yorks.; Mr. W. S. Palmer, Anlaby, Hull; Mr. Joseph Park, Lincoln; Mr. F. Parkin, Nottingham; Mr. Philip Peters, Tunbridge Wells, Kent; Mr. Joseph Popple, Brigg, Lincs.; Mr. Charles B. Rayner, Fordley Hall, Suffolk; Mr. Jonathan Rayner, Falkenham, Suffolk; Mrs. E. A. Roberts, Lleweni Hall Dairy School, Denbighshire; Mr. & Mrs. Charles Robinson, Marton, Yorks.; Mr. & Mrs. J. C. Robinson, Ilford, Sussex; Mr. Robert Shepherd, Preston Brook, Cheshire; Mr. James Sadler, Crewe; Mr. T. W. Sanders, Editor of *Farm and Garden*; Mr. B. W. Silk, Coton, Cambs.; Mr. Alfred Smetham, F.C.S., Liverpool; Mr. & Mrs. Clement C. Smith, Trimley, Suffolk; Mr. Geo. Stevenson, Eastbourne, Sussex; Mr. Robert Stevenson, Galston, Ayrshire; Mr. William Stevenson, West of Scotland Dairy College, Glasgow; Mr. R. H. Sutton, Horsham Road, Sussex; Mr. D. Edwin Thomas (Editor of *Farm and Home*) and Mrs. Thomas; Mr. F. H. Thornton, Northampton; Mr. W. A. Weightman, Sunderland; and Mr. William C. Young, *Secretary*.

The Company assembled at Chester on Monday afternoon, June 7th, and proceedings commenced with a reception and smoking concert at the Town Hall on Monday evening by the Mayor (Alderman R. C. Davies) and Sheriff (Mr. H. B. Dutton), at which among others were present:—Mr. George Barbour (Chairman of the Cheshire Dairy Farmers' Association), Aldermen John Jones and J. Egerton Gilbert, Councillors H. Dodd, W. H. Denson, J. Griffith, Dr. Parry, and Major Meredith.

The Mayor, in a short speech, welcomed the members of the Conference, putting the Town Hall at their disposal for the various meetings to be held during the Conference. Mr. J. F. Blackshaw (Chairman of the Conference Committee) responded, giving a short résumé of the objects of the British Dairy Farmers' Association, and thanked the Mayor for the hearty welcome given, and for his kindness in putting the municipal buildings at their disposal.

On Tuesday, June 8th, the serious side of the Conference was in full force, when all the members repaired to the Assembly Room of the Town Hall, where they were welcomed to the County and City of Chester.

On behalf of the Cheshire Dairy Farmers' Association, the Cheshire Milk Producers' Association, and the agricultural landlords and tenants of the County, Mr. George Barbour extended to the Association a hearty welcome to Cheshire. In an interesting speech he emphasized this welcome, and also referred to their Dairy School at Worleston, the first established in this country, and the pioneer of the many now carrying out their necessary educational work all over the kingdom.

The Mayor welcomed the Association to the Royal City.

Lord Belper (President of the British Dairy Farmers' Association) replied, thanking the speakers for the welcome they had tendered, and alluded to the able manner in which dairy farming is carried on in Cheshire. Before opening the Conference the President proposed that the following telegram be sent to the Right Honourable Jesse Collings, M.P. :—" That the British Dairy " Farmers' Association, assembled at Chester, feel your absence " and regret the cause, and they earnestly hope for your complete " recovery." This was seconded, and carried with applause. The President then called on Mr. Primrose McConnell, B.Sc., F.G.S., F.H.A.S., etc., Southminster, Essex, who read the following able and lucid paper :—

THE MILK AND DAIRIES BILL.

When the Committee asked me to prepare a short paper by way of opening a discussion on this subject it was scarcely expected that the Bill would be before the public, but it was produced at the last moment—after the time when papers are supposed to be sent in to the Secretary to get them into type, and I have only had time to touch on a few salient points.

The most important part of the Bill is that relating to the question of tuberculosis, and, in spite of all the high expectations formed, the regulations laid down therein are not likely to satisfy those concerned with the production of milk. The most disquieting feature to me is the power it gives to a Medical Officer of Health to stop the whole of the milk of a farm if a sample of that milk contains one single microbe of the *bacillus tuberculosis*.

The clauses referring to this are not expressed in this way, and I cannot help thinking that some parts of the Bill are mutually contradictory; but if this is not the meaning of the phrases, then these want to be put very much more clearly.

The concurrent issue of an order by the Board of Agriculture dealing with the notification of tuberculosis in cattle, and inspection, isolation, slaughtering, giving of compensation, etc., etc., is to be read as part of this Bill, and we may take it that in a general way no great hardship will be inflicted on individuals as regards this part of the new scheme. If the Bill had stopped at this, then no one could find fault from the farmers' side of the question, while public health would have been efficiently protected, but unfortunately it goes much farther.

If qualified inspectors visit the farms and examine and condemn individual cows, then not much objection can be raised, especially as compensation is to be paid at an agreed-on scale; but when the whole milk yield of a farm is to be stopped at the *ipse dixit* of one man, perhaps a hundred miles away, who need never go near the farm at all, the matter is serious. It is perfectly evident that a

case where milk is "tuberculous"—as it is phrased—is not so urgent as one where, say, there is an outbreak of scarlet fever. The microbes of tubercle are particularly difficult to find, to stain, and to identify in a sample of milk as a matter of ordinary microscopical examination, and their presence can only be shown with absolute certainty by inoculating guinea pigs and seeing the effect on these—a process which takes several weeks, and is, therefore, of little practical use in the case. Yet on the above slender evidence a dairy farmer may be caused great loss, perhaps ruined, for the stoppage of the whole milk yield of, say, 50 or 60 cows at a farm is no light matter. If only a few cows were affected, or if it were only necessary for us to remove those with tuberculous udders or in an advanced stage of the disease, as most farmers do now without any compulsion, then the matter would not be so serious; but as some of our authorities affirm that one-third of our dairy cows are affected with generalised tuberculosis, and would react to the tuberculin test, then it follows that the presence of these microbes in the milk must be very common indeed, and it is doubtful if many dairies would escape this test at all. Personally, I think that tuberculosis is much more common than is generally supposed, but it is just this commonness that gives immunity, for if it had been as deadly to mankind as some people assert, then the human race would have been wiped out long ago. If this clause is left as it is, and carried out to its logical conclusion, then it will make milk production as a business impossible, and the last state will be worse than the first. Power is given to inspectors to cause the removal of cows with tuberculous udders and those in which the disease is apparent; power is also given to the Local Government Board, in conjunction with the Board of Agriculture, to draw up rules and regulations regarding the housing of the cows, the handling of the milk, the cleanliness of the buildings, and about a dozen other things. These, therefore, ought to be enough, and will most assuredly safe-guard public health; but if the wholesale stoppage of milk is to be legalised, it will paralyse those who carry on the dairy business of the country. To me, therefore, the chief drawback to the Bill is the power given to Medical Officers of Health in the administration of it. We most of us know of instances of rampant idiocy on the part of many of these gentlemen, and though this Bill, if it becomes law, will curb them somewhat, yet too much power is still allowed them. In my student days I worked in the same laboratories with some of the men who first went in for the study of sanitary science and gained the degree in public health, and I took some interest in their studies. For the purposes of this paper I looked up the curriculum now carried out at one of the most important schools, and find, as before, that it is distinguished by what is *not* taught about the inspection of farms. Candidates have to "get up" all Sanitary Acts of Parliament, must be able to make microsopic slides of the microbes of infectious diseases, must have "walked" an infectious hospital

for three months, and so on, with several other things; but I do not see that they have to "walk" a cowshed for three months, or in any way make themselves acquainted with the practical production of milk.

When the medical officer of health is going to "inspect" a herd of cows as distinct from a dairy (though a "dairy" is explained in the Bill to include the cowshed and the cows in it at times) he is to take a veterinary surgeon or a veterinary inspector with him. This is for the purpose of preventing him from making a fool of himself, but to me it is obvious that an official who requires to take his dry-nurse with him is not fit to be let loose on unprotected dairy farmers. Because his actual visits to the farm are hedged about with certain restrictions he is the more likely to break out as the result of tests made in his own laboratory in town, and the restrictions on his irruptions in this direction are not adequate enough.

The most satisfactory method to all the parties concerned would be to shunt the medical officer of health on to a siding altogether as regards dairy farms, and appoint a properly qualified veterinary inspector. I notice that the two phrases "veterinary inspector" and "veterinary surgeon" are used in the Bill. I do not know if it is intended to imply that there are two different kinds of individuals, but my suggestion is that a properly qualified M.R.C.V.S. is most likely to make the best kind of inspector, and act on his own initiative.

If the medical officer of health is to run the business, then I beg to suggest that he be further trained so as to be able to come up to the following standards :—

1. He shall be able to know a bull from a cow.

2. He shall be able to milk a cow in the way he demands that it should be done.

3. He shall be able to groom a cow, wash its udder, clean its teeth, comb out its tail, etc., in the way he wants it to be done and at the times he specifies—say, at three or four o'clock in the winter mornings, as well as in the afternoon.

4. He shall be able to "muck out" and swill down a cowshed in the way and at the hours he prescribes.

5. He shall be able to distinguish a tuberculous udder from one in the usual swelled state after calving, from one suffering from "weed" or mammitis, and from one with a teat that has become "blind" and indurated as the result of injury or former inflammation.

6. He shall know enough of the bacteriology of milk to be able to differentiate between the half-dozen microbes which cause disease if they get into the milk, and, say, 130 others which may be met with in milk, and are either useful and necessary in the same, or at least do no harm; in other words, he must know "wholesome" from "unwholesome" microbes.

Apart from these, he may or may not be able to make a proper bacteriological test of milk, or make an injection into a guinea-pig, or go to a medical congress and tell his medical brethren that he is making it hot for the farmers of his district; but in any case farmers are entitled to ask that the man who lays down the law as to how they are to conduct their business, and who may be the cause of the ruin of many individuals, should know something about the practical details of the matter himself. As the actual details of dairy work and the conditions under which it is to be carried on are, however, to be drawn up by the Local Government Board and the Board of Agriculture conjointly, it is probable that medical faddists will be tamed down considerably in this line; but there is no telling what may happen.

It is unsatisfactory to note that each medical officer of health shall not be confined to his own district. Hitherto there seems to have been no limit, and cases have occurred where a farmer has had to put things right to suit the inspector sent by one authority only to find that an inspector from another authority could condemn them. Even amongst the officials themselves this leads to friction, for the county inspector resents the incursions of the town inspector into his territory and the latter's interference, where the county official thinks he ought to know best, and probably thinks so rightly. In future an inspector going outside his own district need only notify the sanitary authorities of the district where he means to make trouble, but this dual control—which may in some cases be treble or quadruple where farmers send milk to different towns—is a state of matters we must have ended. If there is a qualified county inspector who has examined and passed a cowshed and its cows and belongings, that ought to be enough; if the man in town finds that the milk under his microscope is not right, let him notify the county man to see to it, and let the latter do the work.

We have had endless fights with town inspectors, having town-bred authorities behind them, on points connected with cubic air space, lighting, ventilation, floor space, and a host of other points, as these gentlemen often insisted on ridiculous or impossible conditions in the housing of cattle, so it is satisfactory to know that this power is to be taken out of their hands.

Another point to which attention must be called is the inclusion of tuberculosis as an infectious disease in the same category with scarlet fever, typhoid, etc., etc. This is, of course, a matter none of us are likely to agree with, and is not warranted by the facts of the case. It is outside the scope of this paper to discuss the tuberculosis question, but it may be pointed out in passing that at the Conference on the subject held at Washington last September, Dr. Koch reiterated his opinion that bovine and human tubercle were not caused by the same bacillus; while the far-fetched experiments of the Royal Commission enquiring on the subject in

this country have not proved the communicability of the disease—have, indeed, proved the extremely remote possibility of transmission, assuming that it can be transmitted.

To one clause included in the Bill I respectfully call the attention of all officials charged with administering details, and that is where it provides that if a producer of milk has had an order made wrongfully against him to stop his milk supply, he shall be entitled to full compensation from the sanitary authority for loss and damage. As a result of this, dairy associations throughout the country will immediately create funds for the purpose of enforcing these claims in the case of their members, and officials will therefore be well advised to "gang warily."

The clause referring to the examination of imported milk is a very tame and inadequate one. It leaves to the discretion of the Local Government Board the making of regulations to prevent danger to public health. We may perhaps leave it at that, but if those regulations are not exactly the same and as far-reaching and minute for the foreign producer as for the home producer, then the officials at the Local Government Board will have a hot time of it and get their lives made a burden to them. We shall insist that the Milk and Dairies Bill shall apply in every detail to the foreigner just as it is to do to us, and if he will not conform to the same, then he must do exactly the same as we are to be compelled to do—keep his milk at home.

It is rather strange to find, after all that has passed, that municipal depots for the sale of "specially prepared milk" are legalised and provided for by this Bill. Nowhere is any reference to sterilising or pasteurising or "humanising" of milk made in it, but it is fair to assume that this is what is meant by "specially preparing" it. Now, apart altogether from the question of the frightful expense incurred by these municipal depots, the competition with private traders, and the fact that private traders could produce manipulated milk of any kind required at a much cheaper rate than municipal officials could, there is the fact that faked-up milk of all kinds is not good for babies. When a Bill was before Parliament a few years ago on this question, to legalise what had already been done by the officials of some municipalities, a deputation from the Infants' Health Preservation Society, headed by Sir Lauder Brunton and other eminent medical authorities, waited on the President of the Local Government Board to urge reasons against the use of pasteurised or sterilised milk, because its use was inimical to the healthy growth of children. I have personally understood that there was overwhelming medical and scientific evidence to prove that the belief that milk was spoiled by boiling, as a baby's food, is the correct one. At any rate, there ought to be a full inquiry into the matter before the fads of the medical officers of a few municipalities should be made the law of the land.

One point that needs remark is that "warranties" are abolished. Under the old system, when a vendor's milk was found to be under the "standard" as to quality, it was a sufficient defence if a warranty from the farmer or previous seller was produced to shift the onus on to the giver of the warranty, and the prosecution had then to consider pushing the case further against a new and more remote defendant. This is now done away with, so that each vendor is responsible for his milk irrespective of its origin.

No reference whatever is made to the administration of the Board of Agriculture regulations regarding this "standard" or limit of the analysis of milk. We have to produce milk with not less than three per cent. of fat and eight and a half per cent. of other solids, but the Board issued regulations which allowed a defendant to produce evidence to exonerate himself if his milk fell below these limits from natural causes. It has been a constant source of complaint that magistrates ignore these regulations and refuse to give a farmer an opportunity of defending himself, and therefore a clause to this effect included in an Act of Parliament would be gratefully received.

Just about a week before the issue of this Bill the Local Government Board issued as a Blue-book a report by Dr. Eastwood on the American Methods of Control and Improvement of the Milk Supply. Dr. Eastwood was attending the Conference at Washington, and was commissioned to inquire into American methods while in the States, and it is strange that some of his suggestions are not adopted. Much that he says we are not likely to agree with, but one notable suggestion he makes, and one that has struck me as valuable, is that regarding the use of scoring cards by the inspectors, and the publication and comparison of the resultant figures. The plan followed is as follows: The inspector—who may be one privately employed by a milk firm who buys from many farmers—on visiting a farm enters on a card the marks or points he awards to the various matters on an agreed upon scale of percentages. The figures given by Dr. Eastwood are as follows:—

Cows	20	points.
Sheds	25	,,
Dairy	20	,,
Milking	15	,,
Handling Milk	20	,,
Total	100	,,

In one series of tests of this sort the best farm scored 99 per cent. and the worst 62; while in another series of inspections taken at every month over a year there was a gradual rise in the totals gained from month to month. It was found that the institution of the method of assessing the comparative values of the management of different farmers resulted in a certain amount of friendly

rivalry amongst them. A man who came out low down on the scale was put on his mettle to improve matters and get as good marks as the others, either by a little more cleanliness in the sheds, in grooming the animals, in straining or filtering or cooling the milk, or in some way improving his conditions either on his own initiative or on the advice of the inspector. It would naturally follow, of course, that a milk producer who did nothing to help matters, and who persistently got a low total on the scale, was first warned, and then his milk stopped if no improvement followed.

The principle of inspection and marking results is not unknown in this country, for the Irish creameries have an arrangement for surprise visits of inspectors, who assess their conditions by marks, and the results are published. This has the effect of keeping everyone concerned on the alert to keep things right, and to strive after improvement.

A system of inspection by score-card, however, requires very well-trained inspectors, and men who, in addition to being tactful and agreeable personally, are thoroughly acquainted with the possibilities and limitations of dairy farming, whatever their scientific attainments are. If a bossy sort of man undertakes to dictate a little too much, there is likely to be trouble and difficulty in getting things done properly, more especially if an attempt is made to "try on" or to "bluff."

It is possible that a system of this sort may be included in the rules and regulations the two Boards concerned are empowered to draw up, but it strikes me as being one of the most practicable methods of inducing spontaneous improvement on the part of farmers themselves. Nothing is attempted in this Bill in the way of wholesale eradication of tuberculosis in cattle: visibly affected animals only are to be dealt with, and for the rest, if tubercle microbes are found in the milk, then the dairy is to be shut up and the farmer left to sink or swim as he best can. Outside this latter matter there is not much that a farmer can complain about—assuming that the regulations still to come will be sensible and reasonable—but this one point is one of vast importance, and overshadows everything else. It requires a lawyer to read an Act of Parliament to quite understand it, so that it is satisfactory to learn that there will be plenty of time to discuss this Bill here and elsewhere before it is brought up for a second reading.

APPENDIX.

Milk and Dairies Bill.

Memorandum.

The main objects of this Bill are to provide for—

(1) The more effective registration of dairies and dairymen;

(2) The inspection of dairies and the examination of cows therein;

(3) The prohibition of the supply of milk from a dairy where such a supply has caused or would be likely to cause infectious diseases, including tuberculosis;

(4) The prevention of the sale of tuberculous milk;

(5) The regulation of the importation of milk so as to prevent danger to public health arising therefrom;

(6) The issue of regulations for securing the supply of pure and wholesome milk;

(7) The establishment by local authorities in populous places of milk depots for the sale of milk specially prepared for infants.

The provisions as to registration supersede the provisions as to the registration of dairies contained in the Contagious Diseases (Animals) Acts and the orders made thereunder.

The provisions as to the inspection of dairies and the prohibition of the supply of milk reproduce with amendment section 4 of the Infectious Diseases Prevention Act, 1890, section 71 of the Public Health (London) Act, 1891, and the model milk clauses incorporated in many local Acts.

The clause as to the prevention of the sale of tuberculous milk is also taken from the model milk clauses, but the scope of the enactment is somewhat extended.

The Board of Agriculture and Fisheries will in connection with this Bill issue an order under the Diseases of Animals Act, 1894, dealing with the notification of tuberculosis in cattle, and the inspection, examination, detention, isolation, and slaughter of tuberculous cattle, and the giving of compensation in appropriate cases.

Arrangement of Clauses.

Clause.

1. Registration of dairies and dairymen.
2. Inspection of dairies and prohibition of supply of milk.
3. Prohibition of sale of tuberculous milk.
4. Power to take samples of milk.
5. Appointment of veterinary inspectors.
6. Power of Local Government Board to make orders.
7. Amendment of Sale of Food and Drugs Acts as to warranties in the case of milk.
8. Regulations as to imported milk.
9. Establishment of milk depots.
10. Enforcement of duties of local authorities.
11. Service of notices.
12. Expenses of local authorities.
13. Provisions as to offences.
14. Interpretation.
15. Application to London.
16. Application to Ireland.
17. Short title, commencement, extent, and repeal.

A Bill

To make better provision with respect to the Sale of Milk and the Regulation of Dairies.

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in

this present Parliament assembled, and by the authority of the same, as follows:—

1.—(1) A person shall not carry on the trade of dairyman in any dairy within the district of a sanitary authority unless he and the dairy are registered with the sanitary authority in accordance with this Act and the orders made thereunder, and if he does so he shall be guilty of an offence, and shall be liable on summary conviction to a fine not exceeding *five pounds.*

Provided that—

(*a*) in the case of a farm comprising several cowsheds it shall not be necessary to register each cowshed as a separate dairy:

(*b*) In the case of a purveyor of milk not having a dairy within the meaning of this Act, the place where he keeps the vessels used by him for the purpose of the sale of milk shall be deemed to be a dairy for the purposes of this section.

(2) The sanitary authority may remove any dairy from the register, or may refuse to register any premises as a dairy, if—

(*a*) the premises become or are unsuitable to the purposes of the business carried on or proposed to be carried on therein; or

(*b*) the premises are a nuisance or do not comply with the provisions of this Act or the orders made thereunder;

but any person who feels himself aggrieved by such removal or refusal may appeal to a court of summary jurisdiction, which may, if it thinks just, make an order requiring the sanitary authority to restore the dairy to, or enter the dairy in, the register.

(3) On the second or subsequent conviction of a dairyman of an offence against this Act or the orders made thereunder the court by which he is convicted may, if it thinks fit having regard to the nature of the offences of which he has been convicted, in addition to or in substitution for any other penalty, order that the name of the offender be removed from the register of dairymen either absolutely or for such period as may be specified in the order.

2.—(1) If the milk from any dairy is being sold or used for human consumption within the district of any sanitary authority, the medical officer of health for that district shall, whether the dairy is situate within or without the district, have power at all reasonable hours to enter and inspect the dairy, and if accompanied by a veterinary inspector or some other properly qualified veterinary surgeon, to inspect the animals therein:

Provided that if the dairy is not situate within the district of the sanitary authority the medical officer of health shall not be empowered so to enter and inspect the dairy unless he has evidence that infectious disease is caused, or is likely to be caused, by consumption of the milk supplied from the dairy, and shall, before inspecting the dairy, give notice of the intention to do so to the clerk and medical officer of health of the district in which the dairy is situate.

(2) If on any such inspection the medical officer of health or the veterinary inspector or surgeon has reason to suspect that any cow in the dairy is suffering from tuberculosis with emaciation or from tuberculosis of the udder, or is giving tuberculous milk, he may require the cow to be milked in his presence and may take samples of the milk, and the milk from any particular teat shall, if he so requires, be kept separate, and separate samples thereof furnished.

(3) Every dairyman and the persons in his employment shall render such reasonable assistance to the medical officer of health or a veterinary inspector or veterinary surgeon as he may require for all or any of the purposes of this section, and any person refusing such assistance or obstructing such medical officer of health or veterinary inspector or veterinary surgeon in carrying out the provisions of this section shall on summary conviction be liable to a fine not exceeding *five pounds.*

(4) If on any such inspection the medical officer of health is of opinion that infectious disease is caused, or is likely to be caused by consumption of the milk supplied from the dairy, or of the milk of any particular cow kept

therein, he shall report thereon to the sanitary authority, and to the Local Government Board, and his report shall be accompanied by any report furnished to him by the veterinary inspector or veterinary surgeon, and the medical officer of health, if he considers the case to be one of urgency on account of the spread or suspected spread of infectious disease, may, pending the decision of the sanitary authority,—

(*a*) agree on behalf of the sanitary authority with the dairyman that the dairyman shall, on such terms and to such extent and subject to such conditions as may be agreed, stop the supply and use of milk from his dairy or from any particular cow kept therein; or

(*b*) make an interim order prohibiting the supply for human consumption, or the use, or supply for use, in the manufacture of products for human consumption, of milk from the dairy or from any particular cow kept therein, until the expiration of such time, not exceeding ten days, as may be specified in the order, either absolutely or unless such conditions as may be prescribed in the order are complied with; or

(*c*) refer the matter to the sanitary authority,

and where the matter is so referred to them the sanitary authority may, pending their final decision, make such interim agreement or order as the medical officer of health might have made.

(5) On the receipt of such a report the sanitary authority may serve on the dairyman notice to appear before them within such time, not less than twenty-four hours, as may be specified in the notice, to show cause why an order should not be made prohibiting him, either absolutely or unless such conditions as may be prescribed in the order are complied with, from supplying for human consumption, or using, or supplying for use, in the manufacture of products for human consumption, any milk from the dairy or from any particular cow kept therein until the order has been withdrawn in accordance with the provisions of this section.

(6) The sanitary authority, if in their opinion the dairyman fails to show such cause, may make such order as aforesaid specifying the ground on which the order is made, and shall forthwith serve a copy of the order on the dairyman, and shall serve notice of the facts on the council of the county in which the dairy is situate, and on the Local Government Board, the Board of Agriculture and Fisheries, and, if the dairy is situate within the district of another sanitary authority, also on that authority.

(7) If any dairyman, whilst any interim or other order made under this section of which he has notice is in force, supplies or uses any milk in contravention of the order, he shall, on summary conviction, be liable to a fine not exceeding *five pounds*, but a dairyman shall not be liable to an action for breach of contract if the breach is due to any such order.

(8) An interim or other order made under this section shall be forthwith withdrawn on the sanitary authority or their medical officer of health being satisfied that the milk supply has been changed or that it is not likely to cause infectious disease, and the medical officer of health shall have power to withdraw any interim order made by himself and, if so authorised by the sanitary authority, any other order made under this section.

(9) The dairyman may appeal against an order, other than an interim order, made under this section or a refusal to withdraw any such order—

(*a*) to the Local Government Board, if the order is made on the ground that an infectious disease (other than tuberculosis or any other disease with respect to which the Local Government Board order that the appeal in all cases should be to the Board of Agriculture and Fisheries) was or was likely to be caused by the consumption of milk from the dairy or from any cow kept therein; and

(*b*) in any other case, to the Board of Agriculture and Fisheries, and on any such appeal the officer appointed by the Board to hear the appeal shall report to the Board and the Board, may confirm, vary, or withdraw the order which is the subject of the appeal, and may direct to and by whom the costs of the appeal are to be paid, and the Board may at any stage of the

proceedings require the dairyman to pay such sum as the Board consider proper to secure the payment of the expenses incurred by the Board in the matter of the appeal, and the expenses so incurred by the Board (including the remuneration of the officer appointed to hear the appeal not exceeding three guineas a day) shall be treated as part of the costs of the appeal. Pending the decision of the appeal the order shall remain in force unless previously withdrawn.

(10) For the purposes of an appeal under this section the Local Government Board and the Board of Agriculture and Fisheries, and any officer appointed by either such Board, shall have the same powers as the Local Government Board and their inspectors have for the purposes of an inquiry under the Public Health Acts.

(11) If any order is made under this section either by the medical officer of health or by the sanitary authority without due cause, or if the sanitary authority or medical officer of health unreasonably refuse to withdraw any such order, the dairyman shall, if not himself in default, be entitled to recover from the sanitary authority full compensation for any damage which he has sustained by reason of the making of the order, or of the refusal to withdraw the order, and in the case of an appeal the Board to whom the appeal is made may determine and state whether an order the subject of appeal has been made without due cause, and whether the withdrawal of the order has been unreasonably refused, and whether the dairyman has been in default.

(12) Any dispute as to the fact whether the order has been made or maintained without due cause, or as to the fact of default (where any such fact has not been determined on appeal by the Board to whom the appeal is made), or as to the fact of damage, or as to the amount of compensation, shall be determined in the manner provided by section 308 of the Public Health Act, 1875, and that section shall accordingly apply and have effect as if the same were herein re-enacted and in terms made applicable to any such dispute as aforesaid.

(13) Where a sanitary authority have delegated their powers under this section to a committee, anything authorised or required by this section to be done to or by the authority shall be done to or by the committee.

3.—(1) If a person—

(*a*) Knowingly sells, or offers or exposes for sale, or suffers to be sold or offered or exposed for sale, for human consumption or for use in the manufacture of products for human consumption, or

(*b*) Knowingly uses or suffers to be used in the manufacture of products for human consumption,

tuberculous milk or the milk of any cow which is suffering from tuberculosis of the udder, or which is emaciated from tuberculosis, he shall for each offence be liable on summary conviction to a fine not exceeding *ten pounds*, unless he proves that the milk has been boiled or otherwise sterilized.

(2) Any dairyman after he becomes aware that any cow in his dairy is suffering from tuberculosis with emaciation, or from tuberculosis of the udder, or is giving tuberculous milk, shall so far as is practicable not keep that cow or permit it to be kept in any field, shed, or other premises along with other cows in milk, and if he does so shall be liable on summary conviction to a fine not exceeding *five pounds*.

4.—(1) It shall be lawful for an inspector of the Local Government Board, or the medical officer of health of a county or of any sanitary district, or any person provided with and, if required, exhibiting an authority in writing from such an inspector or medical officer of health, to take for examination samples of milk:

Provided that the powers of a medical officer of health and of a person authorised by him under this section shall, except so far as the Local Government Board may by order otherwise direct, be exercisable only within the county or district for which the medical officer of health acts.

(2) If any person obstructs a medical officer of health or person authorised by him in the execution of his powers under this section, he shall on summary conviction be liable to a fine not exceeding *five pounds*.

5.—The Local Government Board may by order require the council of any county, borough, or urban district to appoint, or combine with another such council in appointing, for the purposes of this Act, one or more veterinary inspectors, or to employ for those purposes any inspector or other officer appointed by the council under the Diseases of Animals Act, 1894.

6.—(1) The Local Government Board, after consultation with the Board of Agriculture and Fisheries, may make such general or special orders as they think fit for the purpose of carrying this Act into effect, and in particular with respect to all or any of the following matters:—

(*a*) The registration with the sanitary authority of dairies and dairymen, including the inspection and taking copies of and making extracts from the registers, and the fees to be charged in respect of any such matters;

(*b*) The inspection and examination of dairies and cows therein;

(*c*) The lighting, ventilation, cleansing, drainage, water supply, floor space, air space, and construction of floors of dairies;

(*d*) The prevention of impurities in milk intended for human consumption, and the cleanliness of vessels used for or containing such milk;

(*e*) The measures to be taken for cooling milk and otherwise for protecting milk against infection or contamination;

(*f*) The prohibition or regulation of the use of preservatives in milk;

(*g*) The manner of conveyance of milk intended for sale for human consumption, and the identification of churns and vessels used for the conveyance of such milk;

(*h*) The prohibition or regulation of the mixing of the milk in one such churn or vessel with the milk in another such churn or vessel;

(*i*) The labelling of the receptacles of milk for sale for human consumption where the milk is sold otherwise than in its natural state;

(*j*) The provision of assistance to be given by sanitary authorities to county councils and by county councils to sanitary authorities, in carrying out their duties under this Act;

(*k*) The form of orders to be made by sanitary authorities and medical officers of health under this Act;

(*l*) The qualifications, duties, salaries, and tenure of office of veterinary inspectors;

(*m*) The authorities by whom the orders are to be executed and enforced, and the powers of entry and inspection exercisable by such authorities and their officers for the purpose.

(2) Orders made under this section may impose on persons contravening the provisions thereof such fines recoverable summarily as may be specified in the order, not exceeding *five pounds* for each offence, and in the case of a continuing offence a further fine not exceeding *forty shillings* for each day during which the offence continues.

(3) All general orders made under this section shall be laid as soon as may be before Parliament, and the Rules Publication Act, 1893, shall apply to such orders as if they were statutory rules within the meaning of section 1 of that Act.

(4) If the occupier of a dairy alleges that the whole or part of the expenses of complying with any order under this section ought to be borne by the owner of or other person interested in the dairy, he may by complaint apply to a court of summary jurisdiction, and that court may make such order concerning the expenses or their apportionment as appears to the court to be just and equitable under the circumstances of the case, regard being had to the terms of any contract between the parties.

7.—A warranty or invoice shall not be available as a defence to any proceedings under the Sale of Food and Drugs Acts, 1875 to 1907, where the article in respect of which the proceedings are taken is milk.

8.—The Local Government Board shall make regulations under the Public Health (Regulations as to Food) Act, 1907, for the prevention of danger arising to public health from the importation of milk intended for sale for human consumption.

9.—(1) The sanitary authority of any district (other than a rural district) with a population of fifty thousand or upwards may, subject to regulations under this section, establish and thereafter maintain depots for the sale of milk specially prepared for consumption by infants under two years of age, and purchase and prepare milk and provide such laboratories, plant, and other things, and exercise and perform such other powers and duties, as may be necessary for the purposes of this section.

This provision shall extend to any district (other than a rural district) with a population of less than fifty thousand, but not less than ten thousand, if the sanitary authority of the district make an application for the purpose to the Local Government Board and the Board consent.

(2) The Local Government Board may make regulations for carrying into effect this section, and those regulations may (amongst other things) contain provisions—

(*a*) as to the sources of the milk to be obtained;

(*b*) as to the nature of the milk to be supplied;

(*c*) as to the manner in which and the conditions under which the milk is to be purchased, collected, conveyed, delivered, prepared, stored, and sold, including the classes of persons to be supplied, and the prices which may be charged on sale;

(*d*) as to the plant and other things to be provided, and as to the purposes for which, and the manner in which, and the conditions under which they may be used;

(*e*) as to the statistical and other records to be kept;

(*f*) as to the visitation of the homes of the persons supplied, and as to any other mode of obtaining particulars prescribed by the regulations with regard to those persons;

(*g*) authorising and regulating the acquisition and appropriation of land for the purposes of this section, and the disposal of any land so acquired;

(*h*) in the case of the Common Council and the council of a municipal borough, as to the accounts of receipts and expenditure under this Act to be kept by every such council, and as to the audit of those accounts in the same manner and subject to the same provisions as to any matters incidental to the audit or consequential thereon as the accounts of a county council;

(*i*) authorising and regulating the borrowing of money by a sanitary authority for the purposes of this section;

(*j*) as to the employment of officers;

(*k*) authorising the holding of local inquiries by the Local Government Board for the purposes of this section, and requiring returns and reports to be made to the Board;

(*l*) facilitating the co-operation of any sanitary authority having powers under this section with any other such authority, and the provision of assistance by one such authority to another;

(*m*) applying for the purposes of this section, as respects any matters to be dealt with by regulations, any provisions in any Act of Parliament dealing with the like matters, with the necessary modifications or adaptations.

Regulations so made shall be applicable to all authorities having powers under this section, except so far as may be otherwise provided by the regulations.

(3) Population for the purposes of this section shall be calculated according to the returns of the last published census for the time being.

10.—(1) If on a complaint to the council of a county in which a county district is situate—

(*a*) from any four inhabitant householders of the county district; or

(*b*) from the parish council or parish meeting of any parish within the district; or

(*c*) from the sanitary authority of a district within which milk is supplied from any dairy in the county district;

it appears to the county council, after holding a local inquiry, that the council of the county district have failed to fulfil their duties, whether as sanitary

authority or otherwise, under this Act, the county council may pass a resolution to that effect, and thereupon the powers and duties of the council of the county district shall be transferred from that council to the county council, and the county council shall proceed to put in force the powers and duties so transferred.

(2) All expenses incurred by the county council in executing this section in any county district shall be paid in the first instance out of the county fund as expenses for general county purposes, but shall on demand be repaid to the county council by the council of the county district.

(3) If the council of a county or county borough fail to fulfil any of their duties under this Act, whether imposed on the council by this Act or in the case of a county council transferred to the council from the council of a county district under this section, the Local Government Board may after holding a local inquiry make such order as they think necessary or proper for the purpose of compelling the council to fulfil their duties, and any such order may be enforced by mandamus.

(4) If on a complaint to the Local Government Board—

(*a*) from any four inhabitant householders of any county district; or

(*b*) from the parish council or parish meeting of any parish within a county district; or

(*c*) from the sanitary authority of a district within which milk is supplied from any dairy in a county district; or

(*d*) from the district of the county in which a county district is situated,

it appears to the Local Government Board, after holding a local inquiry, that the council of that county district have failed to fulfil their duties, whether as sanitary authority or otherwise, under this Act, the Board may by order declare the council to be in default, and may either—

(i) make an order directing the council within a time limited by the order to take such action or do such things as may be specified in the order for the purpose of remedying the default, and any such order may be enforced by mandamus, or

(ii) make an order empowering the person named therein to perform the duties of the council, and upon such appointment sections 299 to 302 of the Public Health Act, 1875, shall apply.

11.—(1) Any notice, order, or other document required or authorised to be served under this Act may be served by delivering the same or a true copy thereof either to or at the usual or last known residence of the person to whom it is addressed, or where addressed to the owner or occupier of premises, then to some person on the premises, or, if there is no person on the premises who can be served, then by fixing the same or a true copy thereof on some conspicuous part of the premises; it may also be served by sending the same or a true copy thereof by post addressed to a person at such residence or premises as above-mentioned.

(2) Any notice required or authorised for the purposes of this Act to be served on a sanitary authority shall be deemed to be duly served if in writing delivered at, or sent by post to, the office of the authority or council, addressed to the authority or council, or their clerk.

(3) Any notice by this Act required to be given to or served on the owner or occupier of any premises may be addressed by the description of the "owner" or "occupier" of the premises (naming them) in respect of which the notice is given or served without further name or description.

12.—The expenses of local authorities under this Act shall be defrayed—

(*a*) in the case of a county council, out of the county fund;

(*b*) in the case of the Common Council, out of the general rate;

(*c*) in the case of the council of a metropolitan borough, as part of the expenses incurred by the council in the execution of the Public Health (London) Act, 1891;

(*d*) in the case of the council of a municipal borough or urban or rural district, as part of their general expenses incurred in the execution of the Public Health Acts.

13.—(1) Proceedings against a dairyman for failure to comply with an order made by a sanitary authority or a medical officer of health requiring the dairyman not to supply milk from a dairy or from any cow in a dairy may be taken before a court of summary jurisdiction either in the place where the offence was committed or in the place where the dairy is situated, and shall be taken only by the authority by whom or by whose medical officer of health the order was made or by the sanitary authority of the district in which the dairy is situate.

(2) Where a person is convicted of an offence under this Act, and the offence is a continuing offence, the offender shall be liable, in addition to any fine which may be imposed under this Act in respect of the offence, to a further fine not exceeding *forty shillings* for each day during which the offence continues.

14.—(1) In this Act—

The expression "dairy" includes any farm, farmhouse, cowshed, milk store, milk shop, or other place from which milk is supplied or in which for purposes of sale or manufacture into butter or cheese milk is kept or used;

The expression "dairyman" includes any cowkeeper, purveyor of milk, or occupier of a dairy, but shall not include a person who only sells milk of his own cows in small quantities to his workmen or neighbours for their accommodation;

The expression "medical officer of health" includes any person duly authorised to act temporarily as medical officer of health;

The expression "milk" includes cream;

The expression "infectious disease" means small-pox, cholera, diphtheria, membranous croup, erysipelas, tuberculosis, the disease known as scarlatina or scarlet fever, and the fevers known by any of the following names:—typhus, typhoid, enteric, relapsing, continued, and includes any other disease prescribed by an order made by the Local Government Board under this Act;

The expression "Common Council" means the Mayor, Aldermen, and Commons of the City of London in Common Council assembled.

(2) Where milk is sold or exposed or kept for sale it shall be presumed to be sold or exposed or kept for sale for human consumption or for use in the manufacture of products for human consumption, unless the contrary is proved.

15.—(1) The powers and duties of metropolitan borough councils as sanitary authorities with respect to the registration of dairymen shall be exercised and performed subject to any bye-laws which may be made for the purpose by the London County Council.

(2) The provisions of this Act with respect to the inspection of dairies and prohibition of the supply of milk, and the enforcement of duties of local authorities, shall apply to London, subject to such modifications as may be made by regulations of the Local Government Board, and such regulations may provide for any of the powers and duties of sanitary authorities and their medical officers of health under those provisions with respect to dairies situate outside London being exercised and performed by the London County Council, and the medical officer of health of the London County Council, or by some person appointed by him for the purpose.

(3) Any provisions of the Public Health Act, 1875, applied by this Act shall for the purposes for which they are so applied extend to London.

16.—This Act in its application to Ireland shall be subject to the following modifications:—

(1) The Local Government Board for Ireland shall be substituted for the Local Government Board:

(2) The Department of Agriculture and Technical Instruction for Ireland shall be substituted for the Board of Agriculture and Fisheries:

(3) References to the Public Health (Ireland) Acts, 1878 to 1907, shall be substituted for references to the Public Health Acts, a reference to section 274 of the Public Health (Ireland) Act, 1878, shall be substituted for the reference to section 308 of the Public Health Act, 1875, and a reference to

section 15 of the Public Health (Ireland) Act, 1896, shall be substituted for the reference to sections 299 to 302 of the Public Health Act, 1875 :

(4) The expression "medical officer of health" means as regards any sanitary district for which a medical superintendent officer of health is appointed that officer, and elsewhere the medical officer of health of the dispensary district :

(5) References to a parish council or to a parish meeting shall not apply :

(6) The expenses of a county council under this Act shall be a county at large charge, without prejudice to any right under this Act to recover such expenses from the council of a county district.

17.—(1) This Act may be cited as the Milk and Dairies Act, 1909, and shall come into operation on the *first day of January nineteen hundred and ten.*

(2) This Act shall not extend to Scotland.

(3) The enactments specified in the Schedule to this Act are hereby repealed to the extent mentioned in the third column of that Schedule, and there shall also be repealed so much of any local Act as deals with any of the matters dealt with by any of the provisions of this Act or of the orders made thereunder.

SCHEDULE.

Enactments Repealed.

Session and Chapter	Short Title	Extent of Repeal
41 & 42 Vict. c. 74	The Contagious Diseases (Animals) Act, 1878	So much of the Act as is unrepealed except so far as it relates to Scotland
49 & 50 Vict. c. 32	The Contagious Diseases (Animals) Act, 1886	So much of the Act as is unrepealed except so far as it relates to Scotland
53 & 54 Vict. c. 34	The Infectious Diseases Prevention Act, 1890	Section 4
54 & 55 Vict. c. 76	The Public Health (London) Act, 1891	Section 28; Section 71
62 & 63 Vict. c. 14	The London Government Act, 1899	In Part I. of the Second Schedule the last paragraph in both columns
8 Edw. VII. c. 56	The Tuberculosis Prevention (Ireland) Act, 1908	Section 19

Mr. James Sadler (Cheshire) moved a vote of thanks to the reader of the paper, and drew attention to the three chief points in this Bill in favour of the dairy farmer. There were other points which unless due care were given might prove very detrimental, but he hoped the final Bill might be made to be of true service to those mainly concerned.—Mr. Lloyd (London), in seconding the vote of thanks, said the Bill was the commencement of a struggle to eliminate tuberculosis from dairy stock in the country; but while Government were attempting to prevent the sale of dairy produce from home dairies, where the cattle had tubercular tendencies, they were taking no steps to prevent the importation of foreign dairy products from farms where sanitary conditions were unconsidered, and no attempt was made to weed out unhealthy or tubercular animals. The Bill, in his opinion, if carried out to its full extent, would tend to raise the price of all dairy produce without benefiting the farmers—in fact, it was a Bill to benefit London at the expense of the country.—Professor Nuttall thought

the dairy farmer in his own interests watched his herds in order to weed out affected cows, as it would not pay him to keep them, and it was also to his own interest to supply sound wholesome milk, etc. A Milk Bill to be of real use must be compiled by men of common sense, not faddists.—Mr. F. H. Freeth (London) said the press and the medical faddists had brought the Bill into being, but it was most necessary that foreign products should be under similar stringent regulations to our own, otherwise the Bill would have a most unjust and injurious effect.—Mr. Hailwood (Manchester) also spoke, saying that the consumption of milk should be increased, not decreased, and he was afraid the Bill would have the latter effect.—Mr. Shepherd suggested that often it was the dairymen who received the milk who adulterated it by adding separated to pure whole milk, and there should be some clause inserted in the Bill to prevent this.—After some further discussion, Lord Belper, in terminating it, said he was glad to see that there had been no criticism of the object for which the Bill had been introduced. It was as much to be desired by the dairy farmers as by the general public that milk should be pure and in good condition when sold, and though there were doubtless many faults to be found in the Bill at present, it was hoped that ultimately a perfect Bill might be formed.

Mr. Lloyd proposed the following resolution :—

> That this Conference is of opinion that the Milk and Dairies Bill should be strenuously opposed by all members of Parliament unless the compensation be paid out of the Imperial Funds.

Mr. W. H. Hobson (Blackenhall, Nantwich) seconded, but as the terms of the resolution did not meet with general assent, the passing of a resolution was deferred.

After an interval for luncheon, the Conference was resumed, Mr. James Kirby (Boreham Wood, Herts.) reading an excellent paper on

TUBERCULOSIS IN REFERENCE TO THE MILK SUPPLY.

Of all the diseases to which domestic animals have been subjected, the chronicles of agriculture do not reveal one in which such widespread interest has been manifested, as in that forming the subject of this paper. This interest, however, has not been awakened, as in other instances, in consequence of the severe financial loss entailed upon stock owners by the disease, but rather from a more serious issue, viz., *the health of the nation*, it being recognised that tuberculosis in cattle, and consumption in the human being, are identical diseases. This recognition involves, theoretically at any rate, the possibility of transmission of the disease from bovines to man, and *vice versa*.

Historical.—We find the word "tubercle" was first used by Sylvino in 1695 to denote an outgrowth or prominence on the lungs; but the first detailed account of tubercles in the lungs was not made until nearly a century later, when Bailey, in 1794, described them as being no larger than the head of a needle, and the cause of pulmonary consumption, so common in England. In 1803, Bayle, in France, discussed the nature of the grey tubercles of the size of a millet seed found in the lungs, from which we obtain the term miliary tuberculosis. In 1865 Villemin succeeded in inoculating rabbits with both human and bovine material, whilst in 1868 Chauveau inoculated material from ox to ox. Up to the early 'seventies it was generally considered that tuberculosis was a disease of the respiratory organs only, notwithstanding the fact that most other organs of the body suffered equally with them, and it was not until Koch, in 1882, discovered the bacillus of tuberculosis that the disease began in any way to be understood. The disease still failed, however, to produce any interest outside the scientific world until that same worthy professor, in a publication on the etiology of tuberculosis, expressed an opinion, although with reserve, that human and bovine tuberculosis might prove to be produced by the same organism. At once the public interest was aroused, some of the daily papers taking the matter up, and the medical profession accepting the possibility as an undoubted fact. As a result, the milk and meat supplies were immediately assailed as being the disseminators of the terrible white scourge, at that time so little understood, and which was responsible for so great a proportion of the death-rate. Since then the history of tuberculosis in this country has been chiefly remarkable by reason of the more or less organised crusade on the part of the medical profession, as represented by the medical officers of health, against the milk and meat supply generally, in which greatly exaggerated and grave charges have been made against the producers and distributors of those important articles of food. These attacks have been more accentuated since Professor Koch made his memorable pronouncement at the Medical Congress held in London in 1901, in which he stated that the risk of infection to man from bovine sources was very slight, if any. As the immediate result of this speech, the British Government appointed a Royal Commission to inquire as to the facts of the case, and in respect to which they have, up to the present, issued three interim reports. Undoubtedly a great deal of harm has been done to the dairying industry, as also to the health of the community as a whole, by reason of the tuberculous scare engineered by the medical officers of health and some of the daily papers. The public did for a considerable period use less milk individually than formerly, especially in the case of infants and invalids, thus depriving them of an essential nourishment, which no other article of food can supply.

Histological.—Tuberculosis is a contagious disease, common in man, and most of the domestic animals, bovines, sheep, swine, goats, rabbits, cats, dogs, and also birds and fishes. It is caused by a small rod-shaped organism, known as the tubercle bacillus, which can always be obtained from an infected subject. It can live for a very prolonged period outside the body, but will not multiply unless situated on a suitable media, and then only at a temperature not greatly removed from blood heat. Whilst it is easily killed by exposure to sunlight, in the laboratory it requires at least a temperature of 80° Centigrade, equal to 176° Fahrenheit, to kill it. You will usually find it stated that wild animals living in a state of nature are never affected with tuberculosis, but such a statement is not quite true. It is certain that when placed in captivity they are very prone to the disease. Tubercle bacilli are non-motile and strictly parasitic organisms, measuring only 3 to 5 microns in length. A micron is $\frac{1}{25000}$ part of an inch. Being non-motile, it necessarily follows they must be conveyed to their resting-place by some transporting agency in the body. This is usually accomplished by the lymph. Lymph is a moving liquid that exists in nearly all tissues, and which flows from the tissues to the glands. The bacilli, having gained entrance into a body, may, or may not, set up tuberculosis. In the case of an open wound, it may set up the disease at the point of entrance, or on the other hand it may be carried by the lymph to the nearest lymphatic gland, in which case the disease may be set up in that gland, or it may be carried into one of the main arteries or streams of the body and so set up generalised tuberculosis. In the case of a localised disease, it may become caseated. After caseation has occurred, calcification may ensue, and the mass becomes calcareous and non-progressive, or even retrogressive in character, and recovery may take place.

The bacillus is found in the several discharges of all cases where the disease is situated, in a part of the body having communication with the outside world. They may be coughed up from the lungs, and discharged through the mouth or nostrils, or swallowed, and passed through the alimentary canal with the fæces, or may be contained in the fæces where the subject is affected in the intestines. The urine may be infected from tuberculous kidneys or tuberculous penis, and by the vagina from tuberculous womb; while the milk may be directly infected from tuberculous udder, it may also be indirectly affected through the medium of the air and dust from any of the preceding causes. Infection may follow the entrance of the bacillus by inhalation into the lung, by accidental inoculation through an open wound, or by specific inoculation into the blood vessels, the peritoneum, or under the skin. The bacilli are only found in small numbers in the blood vessels, but in the tissues they multiply rapidly, quickly developing new cells, and producing tuberculous lesions accompanied with poison.

Tuberculosis assumes different forms, according to the region in which it is situated; in bovines, for instance, lesions in the lungs are usually found in masses, which do not break down or become discharged so easily as is the case in man. The pleura is often the seat of the disease, when it is popularly termed "grapey," from the nodules taking a form similar to a bunch of grapes. The intestines and their glands, also the liver or kidneys, may be the seat of the disease. The living membrane of the peritoneum may be affected similarly to the pleura.

Human.—There can be no doubt that tuberculosis is responsible for more deaths in man than any other known cause. In the Registrar-General's returns for 1907, the figures given are 56,101 deaths from tuberculosis, representing nearly 11 per cent. of the total deaths from this one cause alone; so that it is not to be wondered at that it is seriously considered by the medical profession generally, and the medical officers of health in particular. We now know the disease is not hereditary, as was at one time thought; it can only be contracted by direct invasion of the body by the tubercle bacillus. This does not mean that cases of tuberculosis at birth are unknown; there have been such cases, but they are exceedingly rare; they absolutely cannot take place unless the uterus of the mother is affected. No matter to what extent either or both of the parents are otherwise affected, the disease cannot be transmitted to the offspring at birth unless the uterus of the mother is diseased. This is usually the last organ of the body to become affected, consequently infection from this source is of so rare an occurrence as to be a negligible quantity. Accordingly we must look elsewhere for the principal factors in spreading this disease amongst mankind. The chief source undoubtedly, to-day, is the same as it ever has been, "the sputum of the phthisical patient." Here the bacilli is expelled from the body in great numbers, by coughing and expectoration chiefly, and in a lesser degree by the simple act of talking. It may ultimately find a resting-place where it will become dry; it is then raised by the wind or a draught, and, floating in the air, is passed into the lungs by the ordinary act of inhalation. On the other hand, it may find its resting-place on some article of food, which, when consumed by man, may give it an entrance into some suitable body. It may also be inhaled directly by a healthy person from a tuberculous patient. Still, the bacillus having gained entrance into the human system, does not necessarily mean that it is going to set up tuberculosis in that person; as a matter of fact, it is only when it finds its resting-place in unhealthy tissue that the disease can make any progress at all. Under these circumstances we should naturally expect to find more tubercular disease in those conditions of life which are conducive to the most unhealthy and weakened tissues, and such appears to be the actual case. A few of the contributory factors in bringing about these unhealthy conditions

are badly-built and damp houses, overcrowding, want of efficient ventilation, insufficient nourishment, and exposure—where either or all of these conditions prevail the system will be more or less debilitated, and so favourable to the establishment of the disease, should the body be invaded by the bacillus at that time. Until 1838 no Government returns of deaths were made, so that we cannot make any reliable comparisons as to what progress has been made in combating the disease with any earlier period than that year. The returns for that year inform us that the total number of deaths from consumption was 59,025, equal to 399 per 100,000 living persons in a population of 15,000,000. In 1907 the 70th annual report tells us there were 56,101 from consumption, equal to 160 per 100,000 living persons in a population of over 35,000,000. The population having increased by 133 per cent., whilst the deaths from consumption have decreased in proportion to the extent of 40 per cent. The principal factors in effecting this progress are the improvement of the present-day conditions existing among the working classes, amongst whom the greater proportion of cases occur, the increase of wages enabling them to be better nourished, and consequently greater resistive powers imparted to the tissues of their bodies; the better housing conditions under which they now exist, bringing with them better lighting and ventilation, dryer houses, and less overcrowding. Education has also considerably helped to bring about this great improvement, which has been more marked in recent years. It is regrettable that no figures are obtainable which would enable us to ascertain in what degree each of the above factors were responsible for the improvement that has taken place.

An interesting statement culled from the Journal of the Local Government Board for 1906, says: "That under the present rate of progress, tuberculosis will be stamped out in forty years."

Bovine.—As regards bovine tuberculosis, we know the disease is produced in a similar manner in bovines to that in man. It has also been ascertained that from 30 to 50 per cent. of the animals in our dairy herds have reached to the tuberculin test, and are therefore presumably tuberculous. I think we may assume that 40 per cent. of the milch cattle of this country are more or less affected with tuberculosis. In the case of fatting cattle, however, 5 per cent. would be much nearer the figure, owing chiefly to their being killed for meat at or before the age at which, as milch cattle, they would be entering upon their useful milking career. So that it is only natural that, attaining a much greater average age, we should find a much larger proportion of them attacked. But there are also other agencies at work in connection with milch cattle conducive to the progress of the disease which are absent in the case of fatting cattle. The more animals are kept in confinement the higher the percentage of tuberculosis. Cattle that are kept entirely in the open, such as is the case in the Channel Islands,

are very free from the disease. Close confinement or captivity in any form does undoubtedly weaken the constitution of all animals, whilst open air existence, with its attendant exercise, promotes that robustness which is so necessary to ward off disease. Naturally, the stronger the constitution the greater the resistive powers of the tissues, and *vice versa.* The strain upon the system in producing milk also has some bearing upon the matter. Heavy milkers—by which I mean cows giving a great quantity of milk—are more prone to the disease than their sisters who only give a small quantity of milk. All these factors—age, confinement, lack of exercise, heavy milking—all act detrimentally to the constitution of the animal, weakening the resistive powers of the tissues, thus causing the animal to become more liable to contract disease.

Bovine tuberculosis, like human tuberculosis, is not hereditary; again, a calf tuberculous at birth, although not unknown, is of such rare occurrence that as a source of infection it may practically be disregarded. As mentioned in the case of human tuberculosis, it can only take place when the uterus of the dam is infected. The principal sources of infection in bovines also are similar to man; the ejected bacillus, with cattle kept in the open, is not so serious, but owing to the climatic conditions prevailing in this country it is necessary that animals, especially those in milk, shall be kept indoors during a portion of the year. Where houses are provided, which are properly ventilated and lighted, and the floors, windows, walls, etc., kept in a good state of repair, the animals not being subjected to draughts, yet getting an efficient supply of fresh air and light, the disease will not in all probability make much headway. But where the reverse is the case, then the disease will usually spread to such an extent that the only way to get free of the scourge will be to slaughter all the animals and disinfect the whole place. Fortunately, while all the cowhouses in this country do not come up to the first illustration, there are but comparatively few that can be placed in the latter category. However, it must not be forgotten that bad housing of itself will not produce the disease. For that to take place the animal must be directly infected with the bacillus; but bad housing will, by impairing the vitality of the organs, so weaken the tissues that such animals will, when brought into contact with an openly tuberculous animal, readily contract the disease. On the other hand, the most elaborate houses will not prevent the disease spreading if there are bacilli-discharging animals present.

Probably cattle most commonly become infected by inhaling dust laden with bacilli whilst in the cowhouse. The system of housing cattle—that is, milking cattle—which finds most favour in this country, and reduces the work of attendance to the lowest possible point, is the very system which most lends itself to spreading the disease. The animals, diseased and healthy, stand in a row side by side. The diseased animal, coughing, expels millions of

bacilli, which are to a greater or lesser extent inhaled by her neighbours, which, if not exactly in good health at the time, are in a fair way to become tuberculous. In this manner it is possible for one diseased cow to infect a whole herd. An openly tuberculous animal should never be allowed to be placed in a house with healthy animals.

Udder.—Tuberculosis of the udder has held a very prominent place in bovine tuberculosis, it being generally admitted that when the disease exists in the udder, the milk of that animal is affected, but not otherwise. Fortunately the udder is almost invariably the last place to become affected, the infection usually taking place direct from the peritoneum, or the lymphatic gland situated over the udder. Cases have been known of the udder being infected through the teat, but such is not often the case. The third interim report of the Royal Commission on Human and Bovine Tuberculosis states that tuberculosis of the udder is comparatively common. But that statement, like several other of their conclusions, is not borne out by facts. As regards the number of milch cattle affected with tuberculosis of the udder, I think a very liberal estimate would be 1 in 500, or ½ per cent. of the animals affected with the disease; on this point several veterinary examinations have been made, and we find that as the result of an examination made of the cows in Edinburgh, there were only 9 out of 2,765 that were affected with tuberculosis of the udder, Lanark only found 3 in over 3,000 cows examined, whilst the London County Council, as published in the 32nd periodical report of their Public Health Committee, only found 3 in 3,283 cows examined, and again their 35th periodical report discloses an examination when only 3 cases were found in 3,565 animals examined; so that these four examinations, covering something like 13,000 animals, only gave 18 affected with tuburculosis of the udder. I cannot conceive how any stretch of imagination can class this as common. The disease in the udder generally commences in the upper part of one of the quarters, the lymphatic gland above usually being enlarged. As time goes on there is a tendency for all four quarters to become affected. The quarter enlarges slowly and generally. It becomes more fleshy to the touch, and less susceptible to pain when pressed. The milk naturally becomes thinner and poorer, and as the disease develops the quantity quickly becomes diminished. At the same time the sediment greatly increases in quantity. Although the milk as it leaves the cow is not affected unless the udder is diseased, it may be contaminated before it reaches the pail, if open tuberculous cattle are in the same house; so that an examination of the milk may disclose the bacillus when the quarter is not affected, unless proper precautions are taken in order that no contamination from outside sources can take place. This has led in the past to certain statements being made that tuberculous animals may give tuberculous milk although the udder may be normal.

Transmissibility.—It cannot be denied that tuberculosis—as understood both by the veterinary surgeon and the medical profession—are one and the same disease; but whether the bacillus of bovine tuberculosis and the bacillus of human tuberculosis are identical types of the same organism may be quite a different matter. As a matter of fact, it was admitted by the British representatives who attended the Tuberculosis Conference at Washington last September that they are not identical types. This being the case, it is quite reasonable to ask ourselves the question whether their virulence in different subjects is in any way modified. We do know that modification of organisms do occur, according to their environment, as previously stated. Tuberculosis is not confined to man and bovines; most domestic animals, as also birds and fish, are attacked, and there are marked differences in the several bacilli. The fish bacillus grows much more freely under artificial cultivation than either the human or bovine varieties, and yields a tuberculin that re-acts with mammalian tuberculosis, yet it cannot be transmitted to the ox. The avian bacillus also differs from mammalian; it is not so much disposed to caseation and suppuration as the human lesions, and giant cells, so very frequent in bovine tuberculosis, are somewhat rare in avian. Again, bovine bacilli flourish best at 37° centigrade, and absolutely ceases to grow at 41°, whilst avian bacilli grow best at 43° centigrade. These important differences between the bacillus of bovines, birds, and fishes would indicate that it is not unlikely, not to say probable, that there are also important differences between the human and bovine types, as announced by Professor Koch in his memorable paper which he read before the Medical Congress in London, and in which the following passages occurred: "Even in my first circumstantial publication, on the Etiology of Tuberculosis, I expressed myself, regarding the identity of human tuberculosis and bovine tuberculosis, with reserve. . . . Though the important question, whether man is susceptible to bovine tuberculosis at all, is not yet absolutely decided, and will not admit of absolute decision to-day or to-morrow, one is nevertheless already at liberty to say that, if such a susceptibility really exists, the infection of human beings is of very rare occurrence. I should estimate the extent of infection by the milk and flesh of tubercular cattle as hardly greater than that of hereditary transmission, and I therefore do not deem it desirable to take any measures against it."

The foregoing were not hastily spoken words. Professor Koch, without doubt, knew the great weight attaching to any expression of opinion that might fall from his lips, more especially in connection with this subject, and therefore he would fully consider the import of each word used and his responsibility in uttering it. No other man, at that time, at any rate, had had such splendid facilities at his disposal for a thorough investigation, and the foregoing remarks were the conclusions arrived at as the result of those investigations.

It is to be particularly noted that Professor Koch does not say that tuberculosis cannot under any circumstances be transmitted from bovines to man, but says the extent of infection is hardly greater than that of hereditary transmission. Hereditary transmission, as ordinarily understood, does not take place. Transmission at birth is only possible, as previously stated, where the uterus of the dam is infected, and no doubt this is what Professor Koch alluded to.

Professor Koch is not alone in the scientific world in his opinion. Dr. Lawrence Flick, President of the International Association for the Prevention of Tuberculosis, in his book, "Consumption a Curable and Preventive Disease," says: "Whether meat and milk can be the media of conveying animal tuberculosis to the human being is still a mooted question; in the light of our present knowledge, we can only say, theoretically they can be; practically, probably they are not; at most, therefore, human beings would not be more likely to get tuberculosis from the use of meat and milk than are animals; all the facts at our command seem to indicate that they would be less likely to do so."

We have seen there are distinct differences between bovine, piscine, and avian tubercle bacilli, also in their pathogenicity for one another, and while it is impossible to transmit tuberculosis from fish to bovines, yet the bacilli of fish yields a tuberculin that re-acts with bovines. We should bear these facts in mind when comparing the relations of bovine and human bacilli. We are unable, for obvious reasons, to conduct any experiments on human beings with regard to this matter, so have to content ourselves with experiments in the opposite manner—human to bovine—and compare the results obtained with those obtained with bovine material on bovines, used under similar conditions. These are the experiments conducted by the Royal Commission, with which we, as dairy farmers, are concerned, and it is only to those experiments contained in the Interim Reports of the Royal Commission which were conducted on these lines that we should pay any heed. We must therefore eliminate all experiments except bovine material on bovines and original human material on bovines. Further, to draw reliable conclusions as to the transmissibility of tuberculosis from bovines to man, it is necessary that only those experiments conducted under every-day-conditions of life should be considered. The public do not take their meat and milk by inoculation or injection; these articles of diet are consumed in the same manner as other food, viz., through the mouth into the alimentary canal, and therefore we must confine ourselves to the *feeding* experiments which were conducted with original tuberculous material. I may say it is common biological knowledge that micro-organisms growing in living tissue or artificial media may be influenced by their environment, and that after a longer or shorter period their characters and properties may be changed,

so that it is not impossible that in the case of human tubercle bacilli being passed through a bovine or a succession of bovines, their characters may become modified, so that they do become in reality bovine bacilli; hence the importance of dealing with original human material only.

The feeding experiments with bovine material on bovines are found in the second interim report. The first experiment shows that six cows' udders were made tuberculous by intramammary injection, and the calves were allowed to suck for varying periods; the calves being kept alive from 74 to 363 days; their diet, therefore, for a very long period, consisted solely of this tuberculous milk. And yet only in one case was generalised tuberculosis produced; in all the other cases the disease was limited and retrogressive. The second experiment was 14 calves, fed with tuberculous milk for varying periods from 36 to 127 days, and not one showed, when killed, more than a limited retrogressive tuberculosis. In connection with this result from feeding tuberculous bovine material to bovine, the following paragraph taken from page 13 of the report is of interest. It says: "In striking contrast to the ease with which (an adequate dose being used) a rapidly fatal progressive tuberculosis is set up in the bovine body by tubercle bacilli subcutaneously injected is the difficulty of producing the same result by feeding." It will be remembered that 18 viruses injected into bovines produced rapidly fatal tuberculosis in each instance, whereas the experiments in feeding only produced generalised tuberculosis in one case out of 20 different animals. The experiments of feeding with original human tuberculous material are found on page 18, and there we find that two heifers, Nos. 11 and 13, were fed 200 and 300 days with human sputum, the result being No. 11, a markedly retrogressive tuberculosis, and in case of No. 13 a still more markedly retrogressive tuberculosis. On page 19 another experiment is recorded, in which four calves were fed for from 91 to 120 days, the result being retrogressive tuberculosis. In this experiment we are informed that the dose given was 30 quarts each animal (30,000 ccm.) of human sputum, representing approximately 150 million million bacilli. The difficulty of producing the disease with these enormous doses surely support Professor Koch in his contention that, though there may be some risk of infection to man from bovine sources, yet it is very infinitesimal. The third interim report does not contain any feeding experiments with human material on bovines. Nor even bovine material on bovines. [There are, however, two feeding experiments with tuberculous milk fed to swine; in the first, three young swine were fed with milk from Cow B which, when killed, all three proved healthy. In the second, two young swine fed with milk from Cow E which, when killed, proved quite healthy.]

Still, there is a remote possibility of man being infected from bovines through the medium of milk. That is a problem which

cannot be solved without properly controlled experiments being carried out with bovine bacilli being fed to man. This is a course of procedure which the people of any civilised country would not permit. Hence nothing remains but for the Government to deal with the matter as a national affair and in a reasonable manner, so that while safeguarding the public as much as possible from the risk of being infected with tuberculosis from the consumption of meat and milk, yet at the same time with the least disturbance to the dairy industry possible compatible with that object.

It would, of course, be impossible to eradicate the disease from our herds entirely, for the simple reason that we are not at present in possession of a perfectly reliable test; neither is it necessary to accomplish such a vast undertaking to secure practically a tubercle-bacilli-free supply of milk and meat.

The means at the disposal of the Government to combat tuberculosis amongst cattle are more efficient than it is possible should be used in respect of human tuberculosis. I allude to the compulsory notification of clinical and open tuberculosis with compulsory slaughter under the Contagious Diseases Animals Act, which, if coupled with compensation—as it should be—would ensure the hearty co-operation of all stock-owners, without whose aid any attempt to deal with the matter must be a failure. No other method can be so effective in fighting the disease and at the same time ensure what is absolutely essential, "the least disturbance possible to the dairying industry;" whilst, as far as the public are concerned, it would practically eliminate all risk of infection to man from bovine sources, if there is any. Clinical tuberculosis includes all cases which can be diagnosed during life without the aid of tuberculin. Open tuberculosis implies that the disease is so situated as to be a source of contamination to other animals and milk; it includes all cases which are capable of expelling the bacilli into the outside world.

As regards meat, there is at present in force a system of inspection which, if efficiently carried out, ensures that all meat sold to the public is thoroughly wholesome.

Mr. John Evens (Lincoln) in proposing a vote of thanks to the reader of the paper opened the discussion by saying how much greater the scare on the score of the transmission of tuberculosis from cattle to human beings was than was the reality.—Mr. George Cooke seconded the vote of thanks, and supported this view, stating that with the increase of the consumption of milk there was a corresponding decrease of tuberculosis among the consumers; moreover, the tuberculin test was not altogether reliable.—Mr. W. J. Laithwood (Cheshire) disagreed with the former speakers regarding the tuberculin test, and while recommending milk as a food, advised milk in its natural state, not sterilized, as it then became less digestible.—Mr. Hailwood (Manchester) advised sterilized milk owing to its keeping qualities.—Mr. Lloyd dealt with some points

in the Milk Bill, referring to the milk of doubtful cows.—After some further discussion, Mr. Lloyd submitted the following resolution: "That this Conference, while recognising the desirability "of the Milk and Dairies Bill and the Board of Agriculture Tuber-"culosis Order, 1909, is of opinion that the cost of compensation "should be put on Imperial Funds, and failing this, that these "measures be strenuously opposed."—Mr. W. H. Hobson again seconded.—An amendment was proposed by Mr. R. Shepherd, thanking the President of the Local Government Board for the introduction of the Bill, but expressing the opinion that the cost of compensation should be borne by the Imperial Exchequer, and adding the opinion that when once notification was given no further liability should be required from the milk producer, and that all Orders should be made as practical and simple as possible. Mr. Jas. Sadler moved: "That a sub-committee be appointed to "draw up suitable resolutions dealing with the Milk Bill for "submission to the Conference on the following Wednesday morning, "the sub-committee to consist of the President, Mr. Blackshaw, "Mr. Lloyd, Mr. McConnell, and Mr. R. Shepherd." This was seconded and unanimously agreed to, the Conference then adjourning for the day.

In the evening Mr. George Barbour entertained all the members of the Conference to dinner at the Grosvenor Hotel. The guests included Lord Belper, the Hon. A. L. Stanley, M.P., the Mayor of Chester, the Sheriff, the Rev. Morris Jones, Messrs. Harry Barnston, Robert Barbour, J. Beecroft, Rowe Morris, B. C. Roberts, C. Lutener, W. C. Brown, J. H. Laybourne, W. Peers, and T. Smith. During the evening Benyon's band played selections.

After the loyal toasts had been given by the Chairman, Mr. Rowe Morris gave the "Clergy and Ministers of all Denominations," coupling with it the name of the Rev. Morris Jones. In replying, the latter made reference to the better feeling now existing in country districts between squire, parson, farmer, and labourer, who were now far more united in their aims than ever before.—Mr. B. C. Roberts then proposed the "Houses of Parliament," coupling the toast with the name of the Hon. A. J. Stanley, M.P., who in responding said that the House of Commons represented very varied communities. His own constituency being purely agricultural, he endeavoured to put forward their interests as far as was possible, but it was difficult to frame Bills which would meet the wishes of all concerned, so that the welfare of all should be considered, and in criticising the Milk and Dairies Bill this should be borne in mind.—Mr. Harry Barnston then submitted the toast of "The British Dairy Farmers' Association," mentioning that he depended on dairy farming for his income. He congratulated the dairy industry in Cheshire for having Mr. George Barbour at their head, and hoped the present Conference would be pleasant and useful to the members attending it.—In his reply to this toast,

Lord Belper expressed the appreciation of the Association of Mr. George Barbour's hospitality, and of the good feeling which had been extended to them. They hoped to learn much from the dairy farmers of Cheshire. He dealt with the various points which had been mentioned during the day in reference to legislation on the subject of milk, and touched on various matters such as compensation, hoping that eventually such regulations might be enforced as would help the country generally and do no harm to the farming community.—Mr. Ellis proposed the "City and Trade of Chester," to which the Mayor suitably responded.—Mr. W. C. Brown proposed "the Chairman," who had had so much to do with encouraging the Conference to visit Cheshire.—The toast was received with musical honours, and Mr. George Barbour, in acknowledging it, hoped the visit would leave pleasant memories in the minds of them all.

On Wednesday morning the members visited the Chester Cheese Fair, seeing a large pitch of cheese, representing some of the best dairies in the neighbourhood.

The Conference was resumed at 10-15, Lord Belper presiding, supported by Mr. George Barbour and others, there being many Cheshire farmers present among those gathered in the Assembly Rooms.

Mr. Richard Mullock, of Waverton, read a paper on

THE CHESHIRE CHEESE INDUSTRY.

The art of making cheese is a very ancient one, modernised during the 19th century to suit the taste of a free-spending, luxurious age. Perhaps the art is not as old as Scotch ancestry, or as the Welsh language, and therefore may not have been known at the time of the building of the Tower of Babel. However, it is mentioned in the oldest Book, that 1063 B.C. David carried 10 cheeses down to the Israelites when they were encamped against the Philistines: and that is enough to prove that cheese-making is no new innovation. If it was the best food to make little David strong enough to slay the giant Goliath, it needs no arguing now to prove it one of the best and most sustaining articles of human food. Now we are living in times of highest scientific perfection in England, and are on the point of growing every kind of food, yet another hundred-fold more abundantly, by bacteriological fertilizers and electro-cultures.

In this part of the country we possess the elements indigenous for growing bread and cheese, especially the latter. Not only have we suitable climate, soil, cattle, and many good homesteads built by most generous and considerate landlords, but we have a race of unequalled dairymaids, county born and well grown, with an innate

and trained knowledge of the art and practical science of Cheshire cheese making. Consequently our subject is appropriately fixed for consideration to-day. The only unsuitable fixture being the introducer, as this should come under the head of a professor's work, but, considering that Cheshire still holds its own as a practical rather than a scientific county, it was thought that a practical farmer might simply state a Cheshireman's views without giving all trade secrets away, or presenting any debatable questions except what may stir up friendly discussion among our learned visitors that will leave a few bright lessons behind for future practice.

This notable cheese industry is a threefold farming business, viz.:—Producing the raw material; making it into cheese; distributing and selling the cheese.

1.—The Raw Material

is pure, rich cow's milk, and that only. Not goats' or ewes' milk, mixed with herbs, potatoes, bread, etc.; nor are animal and vegetable fats substituted in lieu of cream. To produce and obtain this pure rich milk is more theoretically simple than cheap and easy work—I don't mean the mere milking or drawing it from the cows, that is tedious work enough in itself. The best and most profitable kind of cows must be bred and reared for the purpose, and then fed with most expensive feeding stuffs in addition to the green pastures made and maintained by dear fertilizers.

Up to half a century ago, milk producing received scant attention. Wheat growing was "the pig that paid our grandfathers' rents"; pasture land and cattle were neglected; and cows would have been left unhoused in winter, as young stock were, but for the usefulness in eating straw and making manure. Skilled workmen, ploughmen, and horsemen looked upon the cow as an unclean beast, and wouldn't touch her with a pikel. The farmer's wife had the management of everything pertaining to the dairy, and pocketed the butter-money for her trouble. But there came a change in the tide of these things; milk became more valuable than corn, and gradually flooded corn-growing out.

It was computed 60 years ago that Cheshire kept 95,000 cows, which annually gave only 250 gallons of milk each; this all being made into cheese, yielding 2 cwt. per cow, totalled an annual output of 9,500 tons. By now, in the county—and including just over the border where Cheshire cheese are made—some 250,000 cows are kept, and perhaps the milk from 80,000 to 100,000 of this number is now sent direct away for town consumption and factory condensing, or used for butter-making; and the milk from the remaining 150,000 cows, giving nowadays 500 gallons each, being made into cheese, must yield *an annual output of over* 30,000 *tons.*

We have then undoubtedly arrived at the yet highest point in the history of the county's cheese production; and probably the highest that ever will be reached. Indeed, during the last

year or two several signs of the turn and gradual ebbing away have appeared, viz. :—

1. The increased and rapidly increasing quantity of milk consumed.

2. The prohibitive price of feeding stuffs, which has lately risen 50 to 60 per cent. above its value; thus making cheese production from this much used scource unprofitable.

3. Our dairymaids—and their maids—are getting tired of, or above, their work.

4. The National Socialistic threatenings to cut farms up into small holdings of an unsuitable size for cheese-making, and

5. Consequently causing landlords to lag in the hitherto liberal interest manifested in their farms and tenants.

6. The increasing number of milk-condensing and milk-powdering factories.

Undoubtedly this year *several thousand tons less Cheshire Cheese* will be made than was made two years ago.

Now without going into the chemical constituents and ingredients of milk—the analysis of which is considered complicated on account of contaminating influences—practical farmers are agreed that milk is not all alike of the same strength and quality for cheese-making, that produced on a strong clayey farm being better than that produced on a sandy or peaty soiled farm. Then those feeding stuffs strong in digestible albuminoids, and highly nitrogenous, probably give heavier yielding results in curd, and a firmer texture to the cheese. Besides, as the cow is a breeding as well as at the same time a milk-producing animal, there is a constant drain upon her—therefore, highly nitrogenous food is required in yielding milk (as milk itself is highly nitrogenous), and the fœtus development requires albuminoids in the food. Linseed oil and molasses in meal or cake, also mangolds, potatoes, and like, saccharine, starchy, gassy and fermenting foods cheese-makers do well to avoid. But good water is absolutely necessary.

2.—The Making of Cheshire Cheese.

I discard the word manufacturing as that may also mean adulterating. Several questions now present themselves, viz.: What is an ideal or standard Cheshire cheese? Where best made? By whom? How?

Standard.—There is no written or recognised fixed standard now. But 50 years ago it was a cheese outwardly hard and shining as polished mahogany, very firm, close and silky in texture, and sweet in flavour, after taking a year or two to mature it enough to be eaten. Now, the modern ideal Cheshire cheese I should say is outwardly as firm as an apple, colour bright and clear—texture, rather open, rich or velvety, neither close, sticky nor crumbly—flavour and smell clean and sweet, more nutty than cheesy; taste neither sickly, sweet, nor salty to the palate, neither greasy nor

leathery; and ready to be eaten in eight weeks, and not too ripe or spoiled in as many months.

But not one-tenth of the output comes up to this *ideal.* Every factor has his own standard or *grade of cheese*, which is either curdy, crumbly, close, firm, or soft in texture; and white, straw-white, or one of three shades of red in colour, that suits his customers' acquired fancy and taste in the particular district which he buys for. Thus a factor from one town will buy at a good price cheese that a factor from another place wouldn't buy at a very low, or any price—and *vice versa.* This causes farmers to make *different varieties*, those ready in a week or two—"pot boilers"—being mostly aimed at. For this, the farmers' needful class, goes off well in the factory districts for a few spring months; but it always gets overdone and causes a slump before midsummer, on account of its perishableness.

The best place in which to make cheese, practice teaches, is a clean, light, roomy dairy in the homestead on the farm, and on every separate farm. Factories have proved a failure chiefly because milk is so easily affected by being knocked about and mixed up. Cases have been observed where the milk from two adjoining farms only has been cheesed in one dairy, but the finished article turned out was not so good as when made in the separate dairies on the spot.

Many of our dairy homesteads have been built at vast expense; some you will see this week, and admire, on the estates of the Duke of Westminster, Lord Tollemache, Lord Crewe, and others, whose farms are generously equipped. On the other hand, there are hundreds of anxious dairymaids who think more good would be done by you visiting and denouncing their kind of inconvenient and entirely unsuitable places that they cannot possibly make an ideal cheese in: but as most of these farms are under 50 acres—which is about the minimum size to be able to continually produce enough milk to make cheese while in its sweet condition, these struggling tenants have no immediate rich prospect before them. There must be *thousands of farms of unsuitable size* for best cheese-making.

In round figures, Cheshire's 650,000 acres are divided into 12,000 holdings—3,000 are under five acres; 5,600 others under 50 acres; 3,330 between 50 and 300 acres; and only 70 over 300 acres each.

The makers of Cheshire Cheese are the farmers' wives and daughters. Without doubt or suggestion of this ever being undignified or ignoble work, it is a pure domestic, business occupation for the gentler sex, who possess the touch, taste, and smell, as well as quickness of brain and technique. Until recently no lad would have dared to enter the dairy for fear of being called a "mollycot," or told to go and curl his hair and mend his stockings. Behold now, when all other women are pushing into men's occupations,

our best dairymaids are modestly retiring from an occupation which is not masculine, and when they have left the cheese-making in the hands of mere men the charm, if not the art, will soon be lost. Anybody since the days of Job can curdle milk and gather the casein from it into cheese, but *how to make Cheshire cheese* is now the crucial question. We will begin by making a good foundation, which, Pyramid like, should be very broad. Then, all the measured ready-made details of manipulation, so often now enumerated, will fit in their places to a nicety.

As already mentioned, the only material is pure milk; but something is needed to solidify it and make it eatable. Rennet to curdle and heat to harden it, if used immeasurably, would turn it into a leathery mass. Our great-grandmothers were adepts in the art of measuring, apportioning, scalding, and cooking until they turned out the finished article uniformly sound and up to the standard. But occasionally atmospheric changes, as on thundery days, affected the milk, and, consequently, the cheese made that day was, with many bemoanings, looked upon as spoilt. These kind would be cast aside by the factor as unmarketable in London, where nearly all Cheshire cheese were sent. But they began to distribute these spoilt things at a low price nearer home, and as the taste for them extended into Lancashire, where factory wages were plentiful, the price was raised, yet more and more were wanted than the thundery atmosphere spoilt.

Then arose the question how to make this *freer textured* cheese without the thunder—as it didn't come often enough. This caused many experiments to be tried, and many cheese were completely spoiled by adding sour milk, whey, or butter-milk, at some, any, and all stages of the making. But it was the late Mr. Jos. Aston, of Brassey Green, who hit on a plan of making *early ripening cheese*, which soon spread all through the county. (This diverted the trade from London, where early ripeners would not, and will not, sell, to Manchester.) But the system was, and is, imperfect, and innumerable were, and still are, the failures to make all cheese uniformly good, on account of inability to apportion the right amount of acidity, rennet, salt, heat, etc., notwithstanding the use of modern dairy instruments and appliances.

Some few dairymaids were, 25 years ago, further advanced in the art and science than the rest, and very discreet they were about it. But the confidence trick—Samson fashion—was successfully practised on them, and they were robbed of their secrets, which were soon exploded for public instruction, and up shot dairy schools and professors. Then very soon the art was in danger of being overwhelmingly lost in a sure and accurate scientific process that would marvellously turn out all cheese as bright and equal as biscuits. But how disappointing it was to discover another power in the air that would spoil the process in spite of everything.

Yet this was the little ingredient that our old practical friend was mixing with much success in his foundation material; but he couldn't properly control it, or give it a name except the starter; and later on in the process when he could detect it in the curd, he called it the conqueror. Now, scientists have named it *bacteria*; and have discovered that while one kind will assist, another kind will injure the process of good cheese-making.

Perhaps bacteriologists think they have discovered all worth knowing, and it is for cheese-makers to employ this knowledge in practice. But until this science is better harnessed to practice, cheese-making difficulties still will present themselves, and it will require very great attention to combat them. Experts have proved to demonstration that lactic acid, the beneficial bacteria, can be used as a cheese starter with excellent results; and what is gratifying to practical cheese-makers is that they also proved, after most exhaustive experiments and tests in Cheddar cheese-making in Scotland, that their scientifically prepared pure culture, and the practical dairymaids' home-made starter produced equal results, and so amounted to one and the same thing. Therefore, to have the milk properly ripened in starting is the sure foundation of good cheese making, and providing the whole vat of milk has been kept free from injurious bacterial influences, no anxiety or trouble need be experienced, beyond the usual manipulation, in turning out a good article.

But bacterial life is everywhere, and we don't want to keep the beneficial little microbes out, but only the bad ones. Scientists discovered years ago that sunshine exerts a direct bactericidal action; but we cannot always command sunshine on the milk, any more than we can lay down a fixed system that will always turn out an ideal cheese. But thanks again to expert bacteriologists who can catch any particular injurious bacillus on gelatine, and show the farmer where it exists and breeds, be it in his shippon, feeding house, food, or water, so that he can destroy the germs at the source before they get into the milk, and on into the cheese. But how to get them out after once getting in, without boiling and spoiling the milk for cheese-making, I have yet to learn.

One experience of my use of the milking machine was the noticable purity of the milk compared with hand milking, and the much larger amount of bacterium culture required to start the cheese-making. Now, I have not time to say a word on the further well-known process of making, and my apology for dwelling so long on the foundation and starter is that nearly all the mistakes and perplexities can be traced to something wrong there; and, that dairymaids are prejudiced against any new scientific methods. Well, all scientific knowledge is nothing without the constant exercise of the skill which has been acquired in course of long, patient training.

3.—The Selling and Distributing

of Cheshire cheese is ten times too big an order to be put on the end of this short paper, for it includes factors, and they want a far more important place than anyone else. I could mention quite a number of people who live on the Cheshire cheese industry, but none who get a fat living save the feeding stuffs' manufacturers and the cheese factors. Yet, under the old and present method of selling and distributing, farmers cannot do without the factors, for both have their interests in the concern, and are held together, and separated, by one golden link. One illustration on the point: Two Irishmen were looking up at a tall building. "Mike," says Pat, "what is it that holds thim bricks together up there without falling?" "Why," answers Mike, "the mortar, sure." "No, bedad, that's the very thing that keeps thim apart."

Now, in concluding, I ask three questions:—

1. Is the Cheshire cheese industry as successful, and profitable to the farmer, as it ought to be?

2. Are we wise in not fixing a standard make of cheese, to be judged up to at all our Shows by "points," as Scotch Cheddars are, instead of the present loose and confusing system, and catchy shady method, so that all our makers may see and know what the ideal Cheshire cheese is?

3. Without any organisation for co-operation in purchasing the essentials for our raw material, or for distributing and selling the finished article, are we keeping abreast of the times? If not, why not? Can we not?

Mr. J. F. Blackshaw, in proposing a vote of thanks to the reader of the paper, said it was beyond all doubt that carelessness and uncleanliness on the part of those handling the milk before it reached the dairy caused as many failures in cheese-making as inattention on the part of the cheese maker. He strongly advised great attention to cleanliness at all points, and further advocated the use of "starter" to ensure an even output of cheese and butter of a reliable character.—Mr. W. H. Hobson, in seconding the vote of thanks, regretted that Mr. Mullock had not confided some of his "secrets" concerning cheese making to others present.—Mr. C. C. Smith (Suffolk) advised Cheshire farmers to follow the lead of other counties—his own among them—in testing the value of co-operation to ensure their obtaining full value in their purchases, and also full value for the sale of their store, stock, and produce.—Mr. Primrose McConnell, in commenting on the paper, suggested that 500 gallons per cow per annum seemed to him a small average. He thought 700 or 800 gallons should be nearer the average; he also commented on the lack of success of cheese factories in this country.—Professor Nuttall advised Cheshire cheese-makers to continue their work on their present system, which appeared to him to be most profitable. He found fault with their system of selling cheese 120lbs. per cwt.—

Mr. A. Smetham (Liverpool) endorsed the previous speakers conclusions on the cleanliness necessary in the treatment of milk.—Mr. Mullock replied to the various criticisms.

Lord Belper then moved the following series of resolutions which had been drafted by the sub-committee to give expression to the views of the Association on the new Milk Bill and Tuberculosis Order :—

(1) "That, inasmuch as the Tuberculosis Order under which cattle may be slaughtered is framed in the interests of public health, it is essential that any compensation for the purpose should be paid out of Imperial funds."

(2) "That, whilst approving of the object of the Milk Bill, it is not, in the opinion of this meeting, desirable to give a Government Department power to make Regulations and Orders under the Bill without these being subject to Parliamentary control."

(3) "That it is not desirable to violate the acknowledged principles of local government by giving power to one local authority to exercise jurisdiction within the area of another local authority."

(4) "That, whilst approving of the provisions under which the Local Government Board is to make regulations for the protection against danger to health arising from the distribution of milk from abroad, this meeting is of opinion that the regulations should be as effective and as stringently carried out as those affecting the home supply, and should also apply to all milk products imported from abroad."

These resolutions were received with applause, and, having been seconded by Mr. James Sadler, were carried unanimously.

It was further resolved that the resolutions be referred to the Council of the Association, with full power to take any steps that they might consider necessary to carry them out.

Lord Belper was accorded a vote of thanks for presiding, and the Conference adjourned.

In the afternoon a large party (120) drove out to Walton Hall, Sir Gilbert Greenall's estate. They were shown round the piggeries, which contained many fine specimens of the large and middle white breeds, and also saw some of the herd of Kerry cows and some beautiful hackneys.

They then drove on to Mr. Robert Shepherd's farm at Parkside. Here they were shown a herd of 240 cows. Most of the milk from this and another herd of 100 at Ince is sold at Runcorn and Widnes, but the surplus is made into cheese. The milking is carried out in a most methodical and cleanly manner, each of the 15 milkers having his own numbered stool and apron. Before and after milking, boys go round with tepid water and cloths to cleanse the cows' udders. After this inspection the whole company were entertained by Mr. and Mrs. Shepherd to a most excellent tea.

Professor Blundell, in moving a vote of thanks to Mr. and Mrs. Shepherd for their hospitality, said the members of the British Dairy Farmers' Association were very fortunate to be holding their Conference under such favourable conditions. They were learning and seeing a great deal, and were deeply indebted to Sir Gilbert Greenall and Mr. and Mrs. Shepherd for their courteous treatment. He asked the company to accord a hearty vote of thanks to their host and hostess. Cheers having been given, the party drove to Halton Station, and from thence by special train to Chester.

In the evening the Annual Dinner of the Association took place at the Grosvenor Hotel. Lord Belper presided, and was supported by the Mayor of Chester, Mr. George Barbour, Mr. G. B. Baker Wilbraham, Mr. Harry Barnston, Mr. Robert Barbour, Professor Nuttall, Mr. Primrose McConnell, Mr. C. Lutener, Mr. P. Ward (Director of Education for Cheshire), Mr. J. F. Blackshaw, Messrs. J. A. Brown, Joseph Beecroft, D. E. Bryd, Richard Fearnall, Rowe Morris, R. Mullock, James Sadler, L. W. Challinor, T. A. Beckett, etc.

The usual loyal toasts were given from the chair, Lord Belper referring to the King as "the friend of the British farmer."

Mr. W. Langridge proposed "The Mayor and Corporation of Chester."—The Mayor, in his reply, said he was delighted to see the Association at Chester, and hoped their visit might one day be repeated. When the members had made their fortunes he recommended them to come to Chester to spend them; they had some eligible building sites, excellent builders, and splendid architects.—Mr. J. F. Blackshaw submitted the toast of the "Dairying of the County." Amid applause, he observed he was exceedingly proud to be able to own that he was a Cheshire man, the son of a Cheshire farmer. He praised Cheshire for the excellence of its produce, especially Cheshire cheese, and congratulated Cheshire farmers on the fact that Cheshire wives and daughters were ready to keep up that excellence by their readiness to make their own cheese. He alluded to the Dairy Institute at Worleston as being the first of its kind in the country, thereby proving the Cheshire farmer's readiness to improve his methods. By taking advantage of education and co-operation the farmer helped himself, and proved himself to be a wise man, but he must also take steps to secure himself against unfair competition from foreign produce. He hoped the day would come when more would be done by Government to support agricultural education, as was done in other countries.—Mr. Joseph Beecroft replied, and said the landlords by their readiness to help their tenants had greatly assisted the farmers of Cheshire. He agreed with the former speaker that some improvement was needed in the Milk Bill, but he hoped that when the necessary alterations had been made farmers would do their best to carry out the provisions of the Bill.—Mr. Richard Fearnall also responded. He said things had not been quite so well for the dairy farmer for the

last few years, but he thought they were improving. He hoped to welcome the members of the Association at his farm on Friday.—Mr. Sadler proposed the "Readers of the Papers," and Mr. Mullock and Mr. Primrose McConnell replied.—Mr. George Barbour gave "The President," and expressed regret that Lord Belper would not be able to remain with them on Thursday. It had been a pleasure to all of them to serve under Lord Belper that week. They knew the assistance he had given to dairy work in Derbyshire. They hoped he would often visit Cheshire, and he would always receive a warm and affectionate welcome.—The toast having been accorded musical honours, Lord Belper rose to respond. He remarked that he had learnt a great deal from the proceedings of the last two days. He spoke at some length on the value of agricultural education, mentioning the Midland Agricultural and Dairy College, in which he had a special interest, and said how much he had been struck by the readiness with which the farmers had responded to advice given them. He hoped in the future agricultural education would receive more help from the State, and be of increasing value to the farmers in this country. He also hoped to see established some central institution for the purpose of Research in Dairying. (Applause.)

On Thursday the whole party visited the Worleston Dairy Institute, where they were received by Mr. Roger Bate, Colonel Cotton-Jodrell, C.B., Mr. George Barbour, Mr. R. P. Ward, and Miss Forster. After seeing over the Institute, and thus having its value convincingly proved, Mr. W. J. Grant proposed a vote of thanks to the county authorities for the opportunity they had afforded the members of visiting the Institute, and congratulated them upon the excellent work which is being done by it.—Mr. Bate acknowledged the vote of thanks.

The company then drove to Henhull Hall, the residence of Mr. T. C. Goodwin. Through the energy and co-operation of the owner (Mr. Tollemache) and the tenant, this farm approaches very nearly to the ideal, and the party assembled looked over it with great interest, and thanked Mr. Tollemache and Mr. Goodwin for their courtesy in thus welcoming them all.

The drive was then continued to Nantwich, where the members of the Conference were received at the Town Hall by members and officials of the Urban Council.—Mr. W. Lea, on behalf of the Council and the Nantwich Trades' Association, welcomed the members to Nantwich.—Mr. C. E. Young, President of the Nantwich Farmers' Club, also cordially welcomed the Conference, and, referring to the Milk and Dairies Bill, said he considered this Bill to be a step in the right direction, but the administration of it would require very careful handling.—The Chairman said these periodical visits were most helpful in bringing members from all parts together to compare the knowledge gained by each so that all might benefit.

Mr. J. F. Blackshaw (Chairman of the Conference Committee) thanked their Nantwich friends for the hearty reception they had received at all hands. One thing had struck them all was the hearty co-operation which existed between landlord and tenant. Referring to the matter of the paper about to be read to the meeting, Mr. Blackshaw mentioned that there was proceeding an enquiry into the subject by the Board of Agriculture, and their report would shortly be issued.

The chair during the Conference in the Town Hall was taken by Mr. Henry Tollemache, a paper on "Contagious Abortion in Cattle" being read by Mr. Alexander Levie, F.R.C.S., of the Midland Agricultural and Dairy College :—

CONTAGIOUS ABORTION IN COWS.

Let me begin by asking you to eliminate from your minds so-called sporadic or accidental abortion, and concentrate your thoughts for twenty minutes on contagious abortion.

Cause.—The cause of this disease is a *bacillus* or rod-shaped bacterium, discovered by Bang, of Copenhagen, and is therefore often spoken of as *Bang's bacillus.* Its natural habit or home is the womb of a pregnant cow. Some authorities say that the actual seat is in the mucous membrane, others in the chorion, or that part of the placental membranes which cover the internal surface of the womb. My opinion is that both are involved, and the fœtus as well. Certainly none are in a healthy condition nor free from the bacillus. We find inflammatory changes going on in the mucous membrane of the uterus and in the structure of the chorion, as well as a mucous exudate lying between them, which teem with the specific organism. I therefore believe I am justified in speaking of this disease as a specific uterine catarrh of pregnant cows, which gives rise to malnutrition of the fœtus, followed by expulsion of it from the womb, dead or alive.

Vitality of the Bacillus.—The resistance to destruction of *Bang's bacillus* under normal conditions is considerable, and in my opinion—from experience gained on investigating many outbreaks—it may lie dormant in the cowsheds and on pastures for years, and in the uterus for months, or until the cow is again pregnant.

To illustrate this, I would draw your attention to three such centres, which were under my personal supervision.

No. I. *An Upland Farm.*—The history I received anent this outbreak was that no pregnant cows had been kept on the farm for many years owing to annual outbreaks of abortion. Thinking this interval of time would have removed all traces of infection, the owner decided to put on the farm twenty two-year-old heifers, and a young bull which had not been previously used for breeding

purposes. All went well throughout the summer and autumn; in October they were taken indoors. Towards the end of December an outbreak of abortion occurred amongst them.

No. II. *A Dairy Farm.*—The tenant had what I will term an isolation field, where in summer and autumn aborting animals were put, so as not to be near any pregnant cows. About a year after I first attended his stock he gave up the farm, which was taken by another party, who knew nothing of his predecessor's system. The summer following, the cows were in rotation turned on to this field. Two or three months after, abortion broke out in the herd. Every possible means were taken to discover through what channel the organism had entered, but without success. Some time after, the farmer was told of this particular field and what the previous tenant had used it for. He did not pay much attention to the story, and the cows in the ordinary course were again put on it, several aborting in from two to three months. No pregnant cows were again allowed on the field, and the following year it was left for hay. During the succeeding winter it was found necessary to give the cows hay. That off this field in question was given to them, and sure enough in from two to three months a fresh outbreak occurred.

No. III. *A Dairy Farm.*—An aborting cow was isolated for three months. At the end of this period she was served by a bull not used for the other stock. At the week-end a discharge of a dirty, slimy nature was observed coming from the vulva, and she was in season three weeks after, and again served by the same bull, and in a month aborted; six weeks after she was again served by the same bull, and in four months aborted. Many similar cases have come under my observation, and to me are quite sufficient evidence to support the opinion I hold in regard to the vitality of the bacillus of contagious abortion in cows.

Distribution.—Infectious abortion is prevalent in dairy districts all over England and Scotland, and has been so for many years. The disease is chiefly distributed by a cow aborting, continuing to discharge the bacilli from the womb, or the calf of such an animal giving them off from the skin and hair, and the discharge from the bowels. They are what I will term unconscious travelling centres of infection or contagion, at home or abroad, and so pollute pastures and cowsheds or other places they come in contact.

Given such centres of contamination, there is no limit to its spread on the farm. The organism may be found on the pastures, in the water, on food, in the air, adhering to dust hanging from the roof or walls of the cowsheds, in manure, in urine, and on the boots and hands of cowmen. It is alike destructive to pregnant cows feeding out of doors as it is to those indoors, and it is chiefly carried by them as they pass from one owner to another.

It becomes, therefore, very important when purchasing a dairy cow in an open market that you should satisfy yourself she

has no such contamination about her. This you can do in every case by opening the lips of the vulva and looking well up the vagina. If healthy, the mucous will be similar to the albumen of an egg, perhaps thicker and whiter; if diseased, it will be discoloured to a greater or less extent, and associated with it a disagreeable odour.

The Bull.—The disease is not natural to the bull, and as a distributor of this disease can only arise through his penis being contaminated with the bacillus of contagious abortion by serving an infected animal, and the period he may continue to be a distributor entirely depends on the length of time this contamination remains with him.

Manner of Entrance.—The way by which the bacillus gains entrance to the system of cows still remains a problem. Various experiments go to show it can enter by certain channels and finally reach the womb, and, when there, cause abortion; but whether all these are natural portals no reliable proof whatever is forthcoming, and while some workers believe in all three ways, others of equal experience do not. The channels suggested are:—

I. Entrance by the Respiratory System.
II. Entrance by the Urino-genital System.
III. Entrance by the Digestive System.

Entrance by the respiratory or the digestive system means the organism ultimately reaches the womb by the circulatory system, whereas entrance by the urino-genital system means either the direct passage of the bacillus into the womb during the act of copulation or its lodgment on the walls of the vagina or lips of the vulva, which, as in the case of bacilli landing from without on the vulva, would of necessity have to work their passage to the womb.

Period of Incubation.—The period of incubation, in my opinion, may be anything from one week to three months—and is regulated entirely by which channel the organism gains entrance, the virulency of the virus, and the resistance of the animal against invasion.

Symptoms of Abortion.—The premonitory symptoms as a rule are few, and often not observed. They appear from one to three days before expulsion of the fœtus takes place, and consist of a discharge from the vulva of a mucous or pus-like substance, which in consistency varies from that of egg albumen to a thin gum solution, and in colour from a faint chocolate tint to a dirty brown.

Accompanying this is slackening of the "bones," the extent of which depends on the period of uterogestation. The actual symptom is premature labour pains and the discharge of the fœtus.

Treatment.—So insidious is this disease that treatment for it is out of the question.

Immunity.—The belief that animals are rendered immun after aborting three times within three years is to my mind a fallacy,

as we find many cows in that period only aborting once, or at most twice, and do not again abort; while others go on aborting year after year. What I contend happens in these cases is the virulency of the organism is reduced after passing through the system of animals so often that the resistance of the animal is more than they can withstand; but place a fresh centre of contamination among the herd, as an aborting cow from another farm, and in time you will have cows aborting. Repeat this two or three times a year and you will always have abortion in your herd. That this is so, I have evidence of for twenty years.

Prevention.—In taking measures to prevent the occurrence of this disease, several precautions are necessary: First, the isolation of all cows brought in for at least a period of three months; and if on inquiry beforehand a cow is found to have aborted, or been in contact with animals which have aborted, she should be shunned.

Next in order is the immediate isolation for three months of any animal aborting on the farm, the burning of the after-birth and all discharges falling on the bedding, and the thorough disinfecting of the standing or loose-box. If the fœtus is dead born, burn it. If alive, kill it and burn the carcase. The attendant on the cow is not to be allowed near any of the other pregnant cows, not even inside the building where they are standing. He must thoroughly disinfect his hands and boots each time after being in contact with the animal. Separate utensils must be used for this cow, her dung and any discharge from the vulva during the three months of isolation to be burned, which practically comes to burning her bedding for that period on each occasion it is removed. The isolation centre to be disinfected twice each month and the floor once a day. The vagina and womb to be washed out daily with a solution of "Chinosol" for three weeks, and afterwards once a week. The food to be sprinkled twice in the week with a solution of mercuric iodide for three months. It is always wisest to fatten these animals for the butcher, but where this is not done, and the cow is kept for dairy purposes, she must not be served with the stock bull, but by another, set apart solely for such animals, and while she is pregnant continue giving the solution of mercuric iodide as before directed.

Directing our attention now to the herd, they should be supplied with plenty of fresh air, light, and cubic space.

If any suspicion of infection arises, all the animals should at once have their food sprinkled and mixed with this soluble mercuric iodide, and given twice a week all the time they are pregnant, and every precaution must be taken to ensure them against infection. Your veterinary surgeon should have the supervision of these duties.

The necessity for such effective measures in dealing with contagious abortion were well demonstrated at three experimental

stations, conducted by the Midland Agricultural and Dairy College, which I had the honour to supervise. One of these covered a period of two-and-a-half years.

No. I. Station.—Cows had aborted on the farm for the preceding 20 years, from two to twenty occurring annually. The experiment was commenced on the 1st November, 1902. Thirty-one cows were examined; seven of these—one of which had aborted—were in a field, and not under cover night or day. The remaining twenty-four were in byres, and of these two had cast calf.

The pastures were old grass fields. Cows at grass were most subject. The sanitary conditions were good. All aborting animals were isolated, and not again bulled. The stage of uterogestation at which abortion occurred varied from the second to the eighth month. The cows were put dry at the seventh month of pregnancy. The following preventive measures were adopted: The immediate isolation of all aborting animals, whose wombs were syringed out with a weak solution of bichloride of mercury, and the pregnant animals had their vulvas sponged with it. The byres were disinfected. These preventive measures were continued from November, 1902, to March, 1903. Five cases occurred in that period. On the 13th March the pregnant cows were each given, every other day in their food, fifteen grains of "Chinosol" in solution, and their vulvas washed daily with a solution of "Chinosol," 1·600. One case occurred in each month.

On May 18th, the use of "Chinosol" was discontinued. On the 20th May a ten-minim perle of "Izal" was ordered each cow thrice weekly. The other preventive measures continued until the 28th November, three cases being reported. On the 28th November all former preventives were stopped, and in their places one-drachm doses of pure carbolic acid in solution was given in food to each animal twice a week and continued until February 16th. Two cases were reported. On February 18th, "Entol" was substituted for, but administered in, the same manner as the carbolic acid. From that date until the Station closed, in May, 1905, only three cows aborted.

No. II. Station.—The history and conditions were similar to that at Station I., forty dairy cows being on the farm.

The preventive treatment was commenced in April, 1904, and consisted of each pregnant cow receiving in food a dose of "Entol" twice a week, and the isolation of all aborting animals and disinfecting their standings.

From the time these preventive measures were started to May, 1905, when the centre closed, only five cows aborted.

No. III. Station.—Thirty-six dairy cows were kept. Abortion broke out among them; immediate steps were taken to cut it short by isolation of the aborting animals, and the administering of mercuric iodide in food. No further cases were reported.

The following extracts from letters received from Mr. N——, No. I. Station, and Mr. P——, No. II. Station:—

Mr. N—— says: "During the twelve months previous to the time I first wrote you on the subject, I had thirty-four cases of abortion. This took place in every field and in every shed we had, and in both cows and heifers alike. For the first six months we did not appear to derive much benefit, but after we gradually began to see an improvement, which has continued until now. We feel confident in saying the disease is swept away, as we have not had a case for a long time. I fully believe it is no use anyone starting this treatment unless they are willing to lay themselves out for constant work and attention, as no results will be attained by simply giving a few doses and then to cease; it must have perseverance."

Mr. P—— says: "When I think of the many losses we had amongst the cows before starting with this treatment, owing to abortion, compared with the few since, I am pleased to say that I believe it has done us a great deal of good, and have hopes that in time it will clear out the disease altogether."

Review.—I asked you to eliminate from your minds sporadic or accidental abortion, because I believe nine-tenths of these supposed cases to be contagious abortion, and therefore if not so treated would, if contagious abortion, be unconscious centres of infection. I advise you to treat them as such.

Three conditions have been brought to your notice, conclusively showing the danger of putting pregnant cows in cowsheds or on pastures once polluted, as well as the risk of infecting the stock bull.

In the case of the diseased cow it goes further, because it raises the question—Does abortion play any part in cows not holding to the bull? Or shall I put it thus—Why are cows so frequently missing service? Now, it is well known that in certain diseased conditions of the ovary, or it may be the ovaries, this symptom occurs; but where you have many cows—often the half of the herd—frequently missing service, it would be idle to suppose they all suffered from diseased ovaries, particularly if abortion at the time is raging in the herd. I therefore contend these cases are due to the presence in the womb of Bang's bacillus, and as a consequence thereof such a cow may abort a week after service, or at any other period between service and the full period of utero-gestation; and the reason I tell you so is I know the bacillus can be found in the discharges from the womb, and, in the case of a fœtus, on its hair, skin, and dung. The ways and means by which Bang's bacillus is transported from an infected centre to a non-infected centre are of a diverse nature, but you may take it from me the main source is through a cow aborting, or a calf from such cow being brought on to the farm, and, therefore, I again impress on you the advisability of the cow, whether calved or not, as well as a brought-in calf, being isolated.

I can only reiterate what I have already said with reference to the bull—it is impossible for him to be the carrier of the organisms of this disease in any other manner than that I have already stated.

The manner by which the organism enters the body I have told you may be accomplished in three ways: the first is by inhaling the organism floating in the air in which the animal is standing; the third by the organism settling from the atmosphere on the lips of the vulva, or by direct copulation. To both of these portals I give little or no credence, but, gentlemen, of entrance by the digestive system, I hold a very different opinion. Nine-tenths of all abortion cases, I am convinced, have the cause entering by this system, and that chiefly through the food partaken of containing the organism. It may be in the hay, as I have told you; it may receive them in the cowshed by settling on to the food; in discharges from pregnant cows; by the hands and feet of attendants polluting the food—and in other ways; and I base my opinion on this fact, that if I disinfect the food before giving it to pregnant animals, as carried out by the College at the three Experimental Stations reported, particularly the last, and attend to the sanitary matters connected with the cowsheds and cows, I can and do cut short all outbreaks coming under my personal care—some of many years' standing.

I am not a believer in immunity through abortion, for although we do get the disease on isolated farms apparently dying out of itself, is that not due to the virulency of the virus reduced than to the resistance of the body? for we find by introducing a new centre of contamination these organisms are not long in bringing about another outbreak of abortion in these imaginary immune animals.

Prevention does not consist of the administering or the applying so-called magic remedies, but rather by careful thought-out ways and means whereby we can combat and prevent the further progress of invasion; neither does it consist in allowing the disease to run a course of three years in the belief at the end of that period it will exterminate itself. No, it is something more ennobling than such base quackery, such passive indifference. Rather is it the discovery of the cause, the extermination of it, and the preventing of its return.

Finally, for this purpose legislation is necessary, as it is in all contagious diseases of animals, but it must be workable, practical, and effective. It must be controlled by county or city councils. It must not be carried out by a joiner, plumber, tinker, or tailor. No; it must be by one versed in such work, who has made a life study of the ways and means to cut short such outbreaks. He verily must be a veterinary officer of health of the highest order, whose word is law in these matters and whose hand must be free to act on his own, equal to that given the county or city

medical officer of health. Any other law, any other system, for such purposes is a makeshift, a source of dissatisfaction, and as a consequence, a farce so far as the eradication of many of the contagious diseases of animals are concerned.

Mr. W. C. Brown proposed a vote of thanks to the reader of the paper, dwelling on the importance of stamping out this disease.—In the subsequent discussion, Mr. Laithwood, Veterinary Inspector for the County of Chester, said there was no disease in the county which caused greater loss to the farmer. In his opinion the contagion was frequently carried from cow to cow by the bull.—Mr. Levie replied to the points raised by the discussion, and the party then proceeded to the Brine Baths Hotel for lunch.

In the afternoon the party first drove to see the farm and stock of Mr. J. A. Brown, of Ridley Hall Farm. They were welcomed by Mr. and Mrs. Brown, and shown over the excellent dairies and farm buildings, seeing some very fine animals, and a nice herd of about 120 milch cows.—Mr. Kirby proposed a vote of thanks, stating how much knowledge Mr. Brown's visitors had gained during their visit.—Mr. Brown replied that he endeavoured to keep his herd up to the mark, and that the homesteads and dairies were built according to his own ideas of what was necessary and suitable.

The company then proceeded on their drive to C. E. Parton's, of Haughton Hall. Here they found a model homestead, built by Mr. Brocklebank for his tenant about 16 years ago. The members looked over the buildings, which were lofty and well ventilated; they also saw the dairies, where some very fine cheeses are made; and the useful herd of cows were also inspected. Afterwards, Mr. Brocklebank showed the visitors over the lovely grounds of Haughton Hall, and they all gathered in a large marquee on the lawn to partake of the tea with which he had kindly provided them.—Mr. Freeth proposed a vote of thanks to Mr. Brocklebank for his hospitable reception of the Association, and thanked Mr. and Mrs. Parton for their kindness.—Mr. Brocklebank, replying, said he recognised that it was to the advantage of farmers to meet together on such occasions and exchange courtesies.—Mr. Parton also acknowledged the vote of thanks.

On the final morning (Friday) of the Conference the members set forth in good time in brakes, which took them through Eaton Park and over the Iron Bridge to the Home Farms of the Duke of Westminster. Here they were met by the Hon. Cecil T. Parker, Mr. John Crowe (Head Bailiff), and Mr. Harry Barnston. The visitors were shown a special parade of shire-horses and mares; the dairy cattle and pigs also came in for considerable praise. The party were also shown over the dairies, which were found beautifully arranged and kept—in fact, the buildings and cattle are models of excellence, and his Grace is to be congratulated on setting such a good example.—Mr. John Evens proposed a vote of thanks to the Duke of Westminster, the Hon. Cecil Parker, and

Mr. John Crowe for giving them such a grand object lesson.—Mr. Crowe, in replying, said it must be understood that the farm was conducted on a business basis. They did not believe in throwing money away, but expected to—and did—make things pay.

The party then drove on to Lea Hall Farm, Aldford, the home of Mr. and Mrs. Richard Fearnall. Here they had the advantage of seeing over one of the best farms in Cheshire, with good land, a generous landlord, and an up-to-date farmer; conditions could hardly be improved. The cheese-making and dairies generally are in the hands of Mrs. Fearnall, who has a great and well-earned reputation for good cheeses; while the pigs, milking cattle, and other stock, all bear witness to Mr. Fearnall's excellent methods.—At the end of their visit, Mr. Caddick in a vote of thanks expressed the indebtedness of the members of the Conference for the kindly welcome they had received, and the many points of interest they had been shown.—Mr. Fearnall replied, and after cheers had been given for the whole family, the party drove on to the Grosvenor Arms, Aldford, where they sat down to a lunch given them by His Grace the Duke of Westminster, and presided over by Lord Arthur Grosvenor, the Hon. Cecil Parker, and Mr. George Barbour.—Mr. Clement Smith proposed a vote of thanks to the noble donor, which was heartily carried.—The party then, by kind permission of the Duke of Westminster, were shown over Eaton Hall and Grounds, Lord and Lady Arthur Grosvenor and the Hon. Cecil Parker personally conducting.—On leaving, a vote of thanks and cheers were most heartily accorded them.

It would be wrong to end an account of this Conference without mentioning Mr. Rowe Morris, to whose admirable forethought and arrangement much of the success of the last day was due. This Cheshire Conference was notable for both instruction and enjoyment, and the memory of it will linger pleasantly in the minds of all.

TURKEY BREEDING FOR THE FARMER:
MATING, HATCHING. REARING, AND PREPARING FOR MARKET.

By S. C. SHARPE, Agricultural and Horticultural College, Uckfield.

In writing these notes, I intend to deal with some of the causes of failure in Turkey Breeding, and to give practical hints which I trust will be useful to the farmer, whether he be an old breeder of turkeys or a beginner at the work.

That a large bird like the turkey should become popular soon after its introduction into this country is easily understood, for with its rapid growth and fine quality of flesh it may readily claim to be first of its kind amongst poultry. We hear of it in its wild state in the northern parts of America weighing, when mature, close upon 60lbs., but since domestication it appears to have lost in weight, for we seldom hear of a bird now weighing over 40lbs., and it must be a good bird at that.

I would like to state that turkey breeding for the farmer should be a remunerative one; there is money in it if worked upon the right lines and with a system, and it is possible for anyone having some pasture and arable land to bring up a flock of turkeys with little expenditure.

It is not necessary to lay out a huge sum of money in buildings and appliances, nor of buying incubators or foster mothers, because I have found in practice they are not needed for hatching and rearing turkeys, therefore, it will be seen that the cost of starting turkey breeding need not be heavy.

Home-made appliances cost a mere trifle, a house for stock turkeys made of poles sunk into the ground, some cross poles being used for the framing fastened with wire, and the whole thatched with straw; not an expensive place by any means, but one which answers the purpose, and is far preferable to an ordinary poultry house, but I will have more to say with reference to appliances later.

Description of Breeds.

There are five breeds well known in this country: the American Mammoth Bronze, the Cambridge Bronze, Black Norfolk, White Holland, and the Buff or Fawn, the last named not being so common. In my opinion, the American Bronze is the most useful for general purpose, and although known in this country for many years its real value was not found until quite recent years. It was a matter of

about 40 years when the turkey began to displace beef and goose for the Christmas dish, and in those days the fashion was for the heavy bird, no matter what kind nor what age, so long as it was large. Latterly people have learned that the medium size bird is far better eating, the flesh is finer, and there is less bone, but still we can make bigger prices of the largest birds, so we must try and produce some, and for this purpose there is nothing better than the American Bronze. It is a hardy bird, full of vigour, and able to withstand much which some of the other varieties are not so fitted for; consequently, these good points and its size has made it one of the most popular varieties of turkeys. I have this year killed some young birds only eight months old weighing 25lbs. each, and it is not unfrequent that birds which have been hatched in April are found to weigh from 26lbs. to 30lbs. Of course I am alluding to young male birds, as the hens always weigh much less. The American Bronze may not be, in fact is not, the finest flavoured bird, the flesh being somewhat coarser than the White or Black, and in the heavy bird much weight is taken up by bone of large size, for we must have large frame if we want large birds. They are rather liable to show a heavy bag in front after being killed. However, with these few minor faults they are a capital farmers' bird, and their hardiness outweighs the faulty points, for, after all, that is the one thing we want to keep in mind, we must have a breed which can stand a rough climate, wet soil, and poor conditions sometimes, and we have here a bird which is not easily upset by weather or climate. The hens are very good layers, and make capital sitters and mothers. The standard weight for the American Bronze is: cock birds 26lbs. to 35lbs., hens 15lbs. to 19lbs. With the heavier birds we find it rather difficult to get the eggs fertilized, and medium weights being more satisfactory for breeding purposes.

The Black Norfolk.

This variety is generally known as one of the finest for table use owing to the quality of the flesh, which is beautifully white and soft. It is of very fine flavour, and being a smaller bird than the American Bronze, it has very small bones, and carries excellent breast meat. The Blacks are extensively bred in Normandy, also in Norfolk; the soil and climate in Normandy seem to suit this variety, for I see many tons of them unshipped at Newhaven every Christmas, and most of them are fine, well-grown, meaty birds. There are not so many Blacks bred in Norfolk as formally, the reason being that they have been inbred rather, and consequently have become somewhat delicate; but when they have been properly mated, and good sound stock used for the purpose, they are still found to do well on the farms in that county. The average weight of fully developed stock birds is about 20lbs. to 24lbs. for the cock birds, and 13lbs. to 15lbs. for the hens. They are fairly good layers, sit well, and make excellent mothers.

The White Turkey.

These go under two or three names, and are said to be imported from Holland, while others claim that they are from Austria, but many think that they are a sport emanating from the Black. It is often noticed in other birds that when two black varieties or strains are mated together some of the offspring throw quite a white colouring, and it is quite possible that this is the origin of the white. They are not kept to a very large extent in this country, and seem to be used chiefly for exhibition or fancy purposes; they are somewhat delicate and difficult to rear, and I cannot recommend them for general purpose. However, on a dry soil, where it is possible for them to find some insect life, the whites thrive fairly well, and the flesh is most delicate and juicy, the bone is small and fine, and the breast is generally very well covered. They are not so heavy as the previous breeds which I have mentioned, the standard weight being about 18lbs. to 24lbs. for the cock birds, and 12lbs. to 14lbs. for the hens, some may be a little heavier, but much depends upon the soil and conditions under which they are being kept—in fact, this applies to all breeds of turkeys. We find it so on some farms in this county that one farmer can turn out several birds from 20lbs. to 24lbs. at Christmas, while another living a short distance off is unable to get any of his birds to turn the scale at 20lbs., although his management may be good—in fact, the feeding may be better—but if the soil does not suit the birds they cannot be made to put on flesh and weight as those can under the better conditions.

The Cambridge Bronze.

This county has always been famous for the turkeys, but the breed is not the same as is used generally in Norfolk. The plumage of the Cambridge Bronze varies very much, but those of reddish brown and grey are mostly seen at the present time in Cambridgeshire. It is a very hardy bird, and until some years ago it was recognized as the finest of the larger breeds of turkeys; but when the craze came in for very heavy birds, the American Bronze took the lead. It is very light in bone, and carries a large amount of flesh; they fatten well, and are adapted to artificial cramming, and when finished off by the cramming machine have breast meat of great thickness, which is beautifully white in colour. They always have a plump appearance, as there is not that prominence of breast bone which we see in some of the other breeds. The cock birds weigh from 18lbs. to 24lbs., and the hens from 12lbs. to 16lbs. They are very good layers, and excellent sitters and mothers.

The Fawn or Buff.

These vary somewhat in colour, and are not extensively bred, being kept chiefly for ornamental purposes. Where one has a fancy for all buff-coloured fowls, they will sometimes breed the buff

turkey. They are fairly hardy, but are not so useful for market purposes. The weight of the cock birds is about 17lbs. to 20lbs., and the hens 12lbs. to 15lbs.

How to Start a Flock.

There are two ways of starting a flock of turkeys—by procuring two or three sittings of eggs and so hatching out a batch of birds and selecting the fittest, or buying a few hens and an unrelated cock bird. The first is the cheapest, but in my opinion not the best method; it takes much longer, and I have known some instances where *all* the birds from the batch have been saved, and this is not wise, for, generally speaking, some of the brood will be better grown and stronger birds than the others, and should then be saved for stock, while the slow growers and any badly formed should be discarded. When this course is followed out, rearing one's own stock may be done with good results, bearing in mind that a good male bird be brought in when the time comes for mating up. Should this plan of starting be adopted, the farmer, or the one he has in charge, should keep a sharp look-out on the birds during the first four or five months of their existence, just as much, in fact, as they would upon a flock of sheep or a herd of stock which they think of keeping for breeding purposes. Any birds which may seem weakly or slow of growth must be marked, and, when the time comes, killed for home use or market. This marking of young turkeys for further reference is quite a simple matter. Suppose, for instance, we have two sittings of eggs from different breeders, and we put them under two hens which hatch off at the same time, if we do not use some kind of mark at once, immediately they get together, it will be impossible to distinguish one lot from the other; but if the birds are toe-punched on placing out in the coop, it will then be quite easy to put a ring upon their leg when they get older—a small punch such as is used for marking chickens will answer the purpose well. They are sold for about a shilling each, and when the young birds are hatched they may be taken in the hand, and with the punch placed between the web of the foot a small hole is cut clean out. The different broods may be punched on opposite feet, or in the first or second web of the foot, as one prefers. In doing this, one should be careful to see that the piece of web is cut clean out, or it may grow together again; but when properly cut, the holes grow larger, and can be seen even when the bird is walking about if the feet are clean. I have had a case brought to my notice only this year where some birds had been marked in this way, and were identified after some nocturnal intruder had promised himself a cheap dinner for Christmas. It is a mark that can never be obliterated. When the birds get three months' old, coloured rings may be put upon the legs, and in this way the different strains can be noted for any length of time. I find it is best not to use red rings, as the colour seems to excite and irritate

the birds, and sometimes causes fighting amongst them. Black or yellow are better to use, and they do not take any notice of these. When rings are used, they should be large, or they may injure the legs.

Yet another reason why it is better to buy birds when starting a flock. If reared, they are liable to be used for breeding before they are mature, and this is unwise, for the results will be disappointing. The hens do not come to maturity until their second year, and if the eggs are used during the first season it will be found that many of the progeny are small and weakly, making it difficult to rear them, especially should the season be adverse. When buying stock turkeys, try to get two-year-old hens and two or three-year-old cocks, then there will be some stamina in the chicks. Maturity in the stock is one of the secrets of rearing the young birds. It is often said that young turkeys are delicate and difficult to rear, but the study of a few of these, what appear minor points, make a great deal of difference, and one finds that the rearing of turkeys is not so difficult after all.

Number to Mate.

From five to ten hens may be put with a cock bird, or Stag as they are sometimes called. It somewhat depends upon the soil and situation. If it is a dry loamy soil the birds are naturally more vigorous than on a damp clay, and the fertility of the eggs can be relied upon under these circumstances. The best time to mate a flock is January, or even earlier, for it is well to let them get accustomed to their surroundings before the egg season comes on. Great care is needed in the selection of birds for mating. Any hens which may have been kept back, or bought in for breeding purposes, should they be out of condition or developed any deformity must be weeded out, for if these are used it will mean trouble in rearing the young; more especially if the male bird has leg weakness, or shows signs of crooked breast, he must be turned out, or the same symptoms will occur in the progeny. As one who has reared a large number of turkeys under different conditions, I cannot impress too strongly the necessity of good sound stock for breeding purposes.

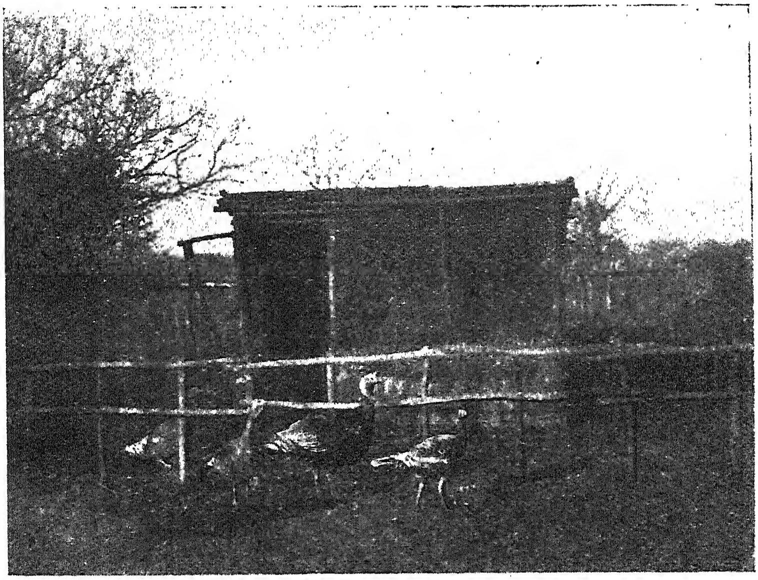
The Best Breed.

It will be seen by the description of breeds which I have given, that the American Mammoth Bronze would be the best bird for the farmer to keep if his aim is large heavy birds at Christmas for the market. Weight tells when it comes to commanding the best price, and larger birds can be reared from this breed than any other; and next to these I would recommend the Cambridge Bronze, for the quality of the meat is so good that it always commands a high price, and is saleable at any time.

Housing the Stock Turkeys.

One need not go to much expense in the way of houses for turkeys; in fact, the breeding stock will do very well if allowed to roost in the trees, but I consider it better for them to have a house or shed, so that they may be sheltered from the bad weather. An open cart shed or barn is a very good place, but they must in any case have good ventilation. It is poison to turkeys to put them into an ordinary poultry house. The house shown in Fig. I. is quite inexpensive, and will answer the purpose well.

FIG. I.



TURKEY HOUSE FOR STOCK BIRDS.

The houses should always be kept clean, and a little disinfectant put down occasionally will help to keep the place sweet and clean. Some good clean straw should be used for bedding, and this can be renewed as often as necessary.

Feeding Stock Turkeys.

This is a very important point, and I must here mention that much harm is done very often by over-feeding the birds. They being good foragers, generally pick up a great amount of food when kept around the farm-yard, and do not therefore require much feeding. What food is given should consist of ground oats,

middlings, and cooked vegetables, a little grain being given at night. The grain may be wheat or oats, the latter should be heavy, and of the white variety. They should weigh not less than 42lbs. per bushel; if thin and light, the birds will not eat them. I do not advise maize feeding for turkeys, it causes too much fat, and this must be avoided if one is desirous of getting fertile eggs. We sometimes have a trouble with the hens when they come on to lay. There are plenty of eggs, but so many of them are shelless. Of course this is useless for our purpose. We keep the birds all the year for breeding, and when they start to lay we hope to find eggs which will hatch out a batch of young birds in due course. When the eggs have no shells they are of no use for sitting purposes nor for market. We often wonder what is the cause of this trouble, and how we can prevent it. I have frequently known hens to lay two shelless eggs in one day. The cause of this is allowing the birds to become too fat: they get full of eggs, and are not able to shell them fast enough. This may go on for two or three weeks perhaps. Sometimes it happens that we have just one or two of the hens from a flock laying such eggs, while the others are alright; these birds should have a tonic, and a good dosing of Epsom Salts; this, with a little reduction of food, will be found to stop them laying for a week or so, and if the diet is changed, and not quite so much given for a short time, the eggs will soon be normal and plentiful. I would advise that some meat be given if the birds have been kept on rather a low diet after the first few eggs have been laid. We generally find the trouble happens during the first batch of eggs, and we seldom have any difficulty of this kind during the second batch, the birds not being in such a high condition.

Cause of Infertility.

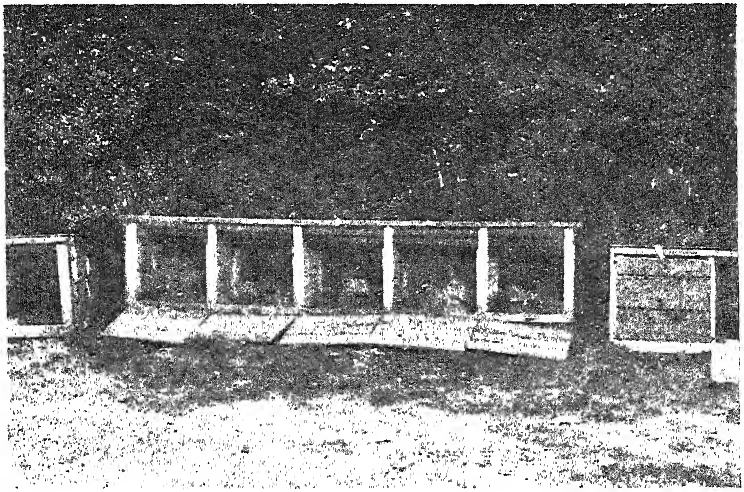
Another very troublesome thing we have to contend with in the hatching season is infertile eggs. Now this may be from two or three causes, more generally it is owing to the male bird being too heavy for the hens. It is not advisable to use a very heavy bird if the hens are not of great weight, a good vigorous bird of medium size is far more likely to fertilize the eggs than a monster of a bird; or, again, it may be weakness. In such cases a little tonic and some good meat mixed with the food will improve matters.

Hatching.

This is best if done under the ordinary hen. The eggs should be taken away from the turkey hen when laid, leaving just one or two for nest eggs, or she may find a nest away. The eggs may be kept for a short time, and then put down under hens in the usual way (*see* Fig. II.) It is best to wait until several eggs are ready, and then put down a good number if enough hens can be procured, for in this way the rearing is much simplified;

and should there be many eggs infertile, it is an easy matter to make some of the nests up with a full number of eggs, starting the other hens with a fresh batch. It always pays one to test the eggs on the sixth day; and if the stock are rightly mated, and in good condition, there will be very few eggs found infertile. The hen must

Fig. II.



Sitting Boxes.

be dusted with some insect powder before putting her down on the eggs, for having to sit a longer time than usual, and it generally being warm weather, they are very liable to get infested with vermin, and if this happens it will mean some broken eggs during the period of incubation. The hens should also have good attention during the time, plenty of good food and clean water, with a little exercise once a day. If they can be taken off the nest and put into a crate or run it gives them some chance for movement, and they may be left off the nest for half-an-hour every day unless it is frosty, but fortunately we do not get very severe frosts when turkey eggs are hatching. About ten to twelve eggs may be put under a good large hen, and if she is a reliable mother she will bring up more than this number. All infertile eggs which have been tested out should be saved for cooking up for food when the young turkeys are hatched. If a hen is somewhat troublesome when the eggs are chipping, it is well to take the batch away, and put them under another hen if there is one to spare, failing this they may be put in an incubator to finish off. It often happens that a hen may sit her eggs well all the time, but when the little birds begin to chirp

she gets uneasy, and will smash all the birds as fast as they come out. The hen should not be taken off during the hatching if she is going on alright. If the hens have been handled every day, when taking off to feed it will be found that they are quite tame, and easy to manage when the young birds are hatching out; even the most wild hen will get tame and perfectly quiet during her sitting period if treated kindly, and this is a great help when the eggs are chipping. It may sometimes be found necessary to help the chick out of the shell owing to the membrane being hard and tough, but should this occur it is well to lightly sprinkle the egg with warm water, but if the following plan is adopted during the last fortnight there will be no trouble arise in this direction. Every morning, just before the hen is placed upon the nest, have some warm water handy, and sprinkle a little underneath and on the breast feathers of the hen; she then goes on the nest as in a natural manner with her feathers wet, just in the same way as if she had been sitting in a hedgerow, and had been out amongst the long grass hunting for a breakfast. This causes a moisture on the eggs, which softens the membrane and makes hatching so much easier. If the weather during the time the eggs are under the hen is very damp it will not be necessary to put water on her, but it should always be done in dry weather, especially if there has been a cold East wind blowing.

Rearing the Young Turkeys.

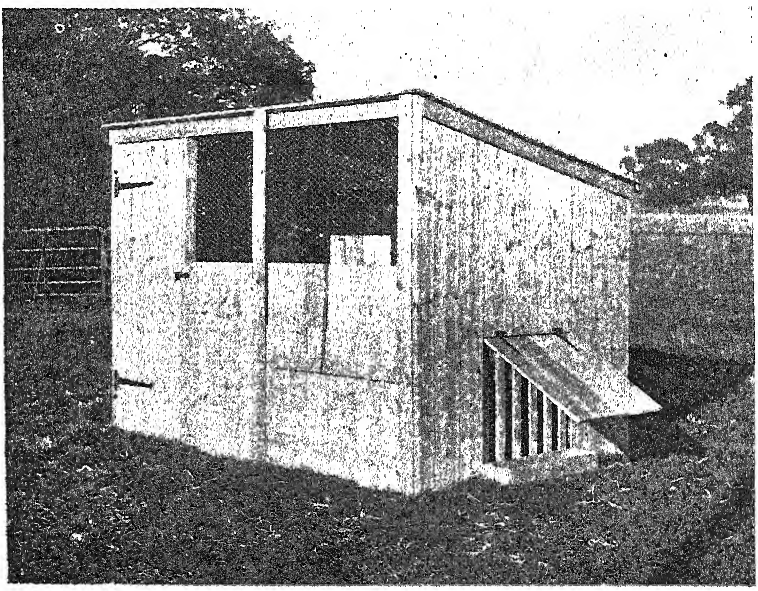
We now come to the most important point of the business, and I will try to describe the most reliable and simple means of doing this work without loss. We generally hear from those who have never reared turkey chicks, or at least only a few, that it is a most difficult undertaking, but I am bound to say that it is as easy as rearing any other kind of poultry if a few precautions are taken. When the birds are nicely dried off they may be placed with the hen out into a coop on to a piece of dry ground. The coop should have a wooden floor to it, so that the feet of the birds can always be kept dry and warm whatever the weather may be, and this floor must be well bedded with chaff, peat moss, or some other kind of litter, which has to be cleaned off as often as time will permit; in wet weather, of course, it requires more frequent cleaning. If the coop has been used previously, it should be syringed out well with some carbolic acid and then limewashed, for if there are any insects lurking about they will soon find a home on the hen, and from there get to the turkey chicks, which will cause much trouble in rearing, and many deaths may occur. The first matter to see to after putting the birds out in the coop is a supply of grit. There are no young birds which eat so much of this material as the turkey, and unless they have a plentiful supply of it they will not digest their food properly; and as much of the trouble experienced with the rearing of turkeys is due to digestive trouble, it is very important that this item should not be omitted. The grit should be of the

small sharp kind—flint is the best to use, and does not cost much per cwt. I find it is sometimes advisable to mix a little of this in the food for the first week or so. Another point we must bear in mind is that the crop of a young turkey is very small, much smaller than the crop of an ordinary chicken, although the turkey is the larger bird; consequently, these birds have to be fed more frequently. It will be found well to feed them every two hours, and here again I find the necessity of hatching the birds out in batches, for it will be seen that it makes the work of rearing so much easier when they are all of one age. The first meal may be given when the birds have been under the hen an hour or so, and the hen must not be forgotten, for if she is not fed well she is continually on the move, being hungry, and will not brood the birds sufficiently. It is best to give her some hard grain when feeding the little ones, she then broods the birds directly they have finished their meal. Do not give them much at a time, for it soon becomes sour, and if left lying upon the ground will be likely to set up some bowel complaint in the youngsters—a thing that they are very prone to. The first meal may consist of hard-boiled egg or egg-custard, and this should be dried off with some turkey meal, a preparation which is sold by some of the Game Food Manufacturers. It is an excellent thing to start young turkeys on, not very expensive, as prepared foods go, about 20s. per cwt., and it lasts well, as very small quantities are required at a time. Some green food should always be used and mixed in with the egg food and meal, chopped cabbage—the Savoy cabbage is the best—also onions. If the green tops of the onions are not available the bulbs can be cut up fine and used; it will be found excellent, and prevents bowel trouble. A little grain may be given when they are a few days old. Groats should form the first meal of grain, and later on some small wheat should be given, not forgetting to replenish the grit trough every day. Occasionally, look to the hen and the chicks, to see if there are any vermin on them, for should there be the birds will soon droop and refuse to eat. I am certain that many young turkeys are lost every year by being infested with insects; a little sulphur and lard rubbed upon the head and under the wings of the birds will prevent much of this mischief. It is well to move the coops a little every day, for the ground in front of the coop will soon become stale, and the birds must have fresh ground that is sweet and clean. It is not advisable to try and rear turkeys where other fowls are running. A nice sheltered hedge, with a sunny bank facing the South is a good place to put the coops, and the drier the ground the better. After a few days some ground oats should be given; the oats must be well cut up, or the husk will cause crop binding. I have frequently found this to be the cause of death amongst the youngsters. If the oats are at all coarse they should be sifted through a fine sieve, but in this county they are generally ground fine enough for use. The birds should have some shelter

to run to if the weather is wet. Some hurdles thatched with straw is a very good thing, with a piece of galvanized iron over the top. This will keep out the rain, and make a cheap and useful shelter. A perch can be fixed up in the shelter when the birds get a few weeks old, for they always like to get up off the ground. If this is done the perch must be a good width, or it may cause crooked breast bones. When the birds get three or four weeks old they may be fed less times a day, and with a coarser and cheaper food. The meal may be made up from ground oats, biscuit meal, turkey meal, and meat, the last-named should be given as soon as the birds can take it without fear of bowel trouble, and it should be given in some form right through the rearing season. The cheaper kind of greaves answers the purpose when the birds get older, and it should be well cooked or scalded before mixing it with the meal.

Care has to be taken of the birds when they are about eight weeks old. This is the time when they "shoot the red," and is known as a critical period; but if they are kept dry, and well fed, this time of change with them need not be feared. It is when they have been neglected and under-fed that they are likely to go wrong when "shooting the red." After this period the birds may be taken away from the hen, and can be put into such a house as shown in Fig. III. It will be noticed that this house has plenty

Fig. III.



Turkey House for Young Birds: Showing Ventilation.

of ventilation, and, not being very large, can easily be moved to fresh ground. It is necessary for the birds to be continually on the move, and where a farmer has some arable land, now is the time when it is so useful for the young turkeys. The picture of the birds on the stubble is a typical one where a number of turkeys are reared on a farm, and it will be seen by Fig. IV. that the birds

FIG. IV.

FLOCK OF TURKEYS IN STUBBLE.

are having a good range. It keeps them busy, and they get a great deal of insect life if allowed to roam in this way. They are also kept at a very cheap rate, and only require about two feeds a day, and some do not even give them so much as that, but let them hunt around and find what they require. I think, however, it is far better to feed them always a little, for our aim is to get large birds, and the better the birds are fed the larger they should grow. When out on the stubble the food should consist of meal and cooked vegetables twice a day; they will generally find sufficient grain on the land, and also insects, so that there will be no need for meat to be given. The plan must be to keep the corn bill down as low as possible without stinting the birds too much.

Preparing the Birds for Market.

This can be done in several ways, and I will describe some of the best methods. The easiest method is by trough feeding. There

is no doubt that it pays to feed the birds extra for some few weeks before killing: it not only puts on weight, but it improves the quality of the flesh, and makes it much whiter in appearance when killed. The birds should be shut up in a shed or barn where there is not too much light, but plenty of ventilation. The shed can be well bedded with clean straw, and troughs such as are used for sheep feeding should be placed in the shed. The food must be good and nutritious, but not too strong, so as to cause the birds to sicken. I might as well say here that a good many turkey breeders make a mistake when fattening their birds by not allowing them sufficient exercise. If the birds are having some very strong food they must have plenty of exercise or they will go sick, and will then lose weight instead of putting it on. I find it best to let the birds out for a run about 10 or 11 o'clock every fine day, and shut them up again about 2 o'clock. They are then very keen for their food. Ground oats, meat, and swedes, or other vegetables, form the chief article of diet for fattening; a little barley-meal may be substituted, and occasionally some maize boiled in milk is good for a change, but too much of this kind of food gives them a bad appearance when killed. Milk should always be given to turkeys when fattening if it is possible to get it, for it is excellent as a food for the birds, and it causes the flesh to look so white, and also makes it soft. About three meals a day is sufficient when they are shut in: no water need be given, as they get sufficient moisture in the soft food.

Another method of fattening is by use of the cramming machine (*see* Fig. V. on page 95).

Where one has one of these machines, and understands the working of it, they will find it very useful for fattening the turkeys. If it has been previously used for cramming chickens, the tube should be changed for turkeys, as they require a longer and larger tube than chickens. The tube should be made of india-rubber. I do not like to use the leather ones, as they sometimes injure the bird's throat and crop.

Fig. VI. (page 96) shows cramming by pellets. This latter method is now quite out of date, it being done so much easier and quicker with a machine. The food has to be mixed up in a much softer state than when trough feeding. It should consist of ground oats, fat, and milk; the fat to be melted down, and poured in amongst the meal, it will then get properly mixed. The milk is more easily digested if it is sour before using. Two feeds per day is sufficient when cramming by machine. They will not take more than this, and the crop does not then always get empty, and should this be the case the bird must be left over until the next time for cramming, or it will soon sicken and lose weight. It will be seen by these remarks that it is an easy matter for the birds to go wrong while under the process of fattening, and I would advise anyone not used to the work to have only a few put on to this system the first

year. There is no doubt that it pays, and a great amount of extra flesh can be put on in this way, but it must be done with care and judgment.

FIG. V.

CRAMMING TURKEYS BY MACHINE.

FIG. VI.

SUSSEX CRAMMING—OLD METHOD: AN OLD SUSSEX HEN WIFE.

Killing.

Before killing the bird a most important point must be remembered, and that is the fasting of the bird. It should be starved at least 24 hours before killing or it will not keep, and is likely to go green on the side, which will cause the bird to be sold at a low figure. When they have been properly fasted they can be killed by dislocation of the neck. I much prefer this method to sticking. Apart from its being much cleaner, the blood is not wasted, and therefore the weight of the bird is not lost, as in the case of bleeding. It is quite an easy matter to break the neck of a young turkey. Hold the wings and the legs together, drawing the bird's head across the thigh, give a sharp pull outwards and upwards, and the neck will be easily broken. Keep the head of the bird downwards while plucking, and all the blood will drain away into the head and neck without making it look unsightly, as in the case of sticking; besides, it makes a great difference to the weight if one is killing 200 or 300 turkeys.

Marketing.

This is generally not very much trouble, for as a rule we cannot get enough birds to supply the markets, and the birds generally realize a good price providing that the breast-bone is well covered with meat. The heavier birds command a few pence per pound more than the lighter ones. If the farmer does not want to have the trouble of killing his birds he can generally make arrangements for the poulterer to send out his men to kill and weigh the birds on the place. The best plan of selling is by weight, and is general in this country.

In conclusion, I would remind farmers who intend to take up the rearing of turkeys to give some thought to the proper mating of the birds as I have previously advised, for here is one of the secrets of successful rearing, and I am quite sure that if more people would give a little time and capital to this most useful industry they would find it both profitable and interesting work.

THE DAIRY SHOW OF 1909.

By W. Ashcroft, 13, The Waldrons, Croydon.

If we look for a distinguishing feature in this year's Show, we cannot help finding it in the elevation of the Goat classes to a place of honour in the Central Hall. Last year the enlarged Gilbey Hall enabled all classes of cheese and butter to be exhibited together in a cooler and better ventilated building, and in 1909 most of the space for many years given to the cheese fair is now allotted to the Goats.

The classes, we were glad to see, rose to the occasion, and breeders and exhibitors may be congratulated on sending the best collection of Goats, taking the classes generally, that have ever been seen at the Dairy Show.

Their competition in the milking trials was also keener, and the results arrived at were a considerable improvement on last year; in proof of which we may point out that the average points obtained by the first ten Goats was this year 15·7; whereas for the same number in 1908 it was only 10·5. Having paid this tribute to one of the minor, let us now turn to the main and more important features of the Dairy Industry to be seen and studied with advantage at the Agricultural Hall.

A comparison with the entries in previous Shows makes the total number rather smaller than the past three years, which is to be accounted for by a slight reduction in several classes, and a somewhat larger one in those devoted to Butter, Butter-making, Poultry, and Pigeons.

	1904.	1905.	1906.	1907.	1908.	1909.
Cattle	164	182	240	237	247	232
Milking and Butter Tests.. ..	167	217	247	245	224	236
Goats	46	51	51	48	72	84
Poultry	2,678	3,068	3,347	3,081	3,280	2,997
Pigeons	2,426	2,440	2,573	2,664	2,564	2,282
Poultry and Pigeon Appliances	—	—	55	65	50	37
British Cheese	250	268	255	420	357	355
Bacon and Hams	46	49	39	57	76	55
Butter	556	641	578	593	668	535
Cream	44	52	42	35	47	42
Skim-Milk Bread, &c.	140	121	159	118	135	115
Honey, &c...	122	124	118	67	85	88
New and Improved Inventions	43	22	17	33	37	31
Roots	184	170	156	177	181	218
Butter-Making Contests	172	206	199	200	207	120
Milkers' Contests	55	66	121	135	132	126
	7,093	7,677	8,197	8,175	8,362	7,553

Cattle.

The Cattle Classes were on the whole well up to the average, though one or two of the classes evoked little or no competition. The class for Pedigree Shorthorns more than maintained the good reputation it has been gaining the last three or four years; the judge considered it "a very good class," "the winners of the 1st and 2nd prizes being good types of the dual purpose cow."

The Non-Pedigree Shorthorns class was also reported as "on the whole a good one."

Lincolnshire Red Shorthorns brought together "a good class of big, strong, well-grown cows, showing decided milking qualities."

Both classes of Shorthorn heifers deserved high praise in the opinion of the judge, and we were glad to see them rather better filled than usual.

In the male class the first prize Shorthorn bull was considered "full of character and quality, and possessing true dairy characteristics, with no lack of substance."

Jersey cows was reported "quite a fair class, with a winner of good type and great quality, and a very good dairy cow second."

Jersey heifers bred in England were pronounced of "average merit," and a good many very useful heifers were to be seen in the island-bred class, which was "headed by two very nice heifers."

Jersey bulls were a small class, only six entries of fair quality.

The judge of Guernseys regrets that few breeders of Guernseys send exhibits to the Dairy Show. The class for cows "was not by any means a strong one," and the class for heifers brought no competition.

Red Polls, both cows and heifers, were generally commended for their dairy qualities.

Ayrshires.—The class was cancelled; there being no entries.

Kerries and Dexters were very moderately represented: two good Kerry cows, but both old, and no Dexters, furnish rather a disappointing competition in classes which are generally fairly well filled.

South Devons furnished the winner of the Spencer Challenge Cup, and the 2nd prize in the class was also a good performer in the milking trials; but the judge of the Inspector classes "did not consider them a representative collection," and "thinks the breed can do better."

The two classes of cows provided for the milkers' contests were "tolerably good, with nothing of exceptional character."

Roots.

The roots were a very fine show, with the common fault that many specimens were much overgrown, and could not stand the test of being cut in two.

Cheese.

Cheddars.—The judges were of opinion that the Cheddar classes were barely up to the standard of some previous years, which they ascribed largely to the wet, cold season. "There was a very considerable amount of irregularity in the make of many of the lots in the class for 20 cheeses, showing a decided tendency to want of acidity;" and though the class of four cheeses was more regular in quality, there were many exhibits too new and unripe.

The first prize in both these classes came from the same dairy, and was a notable exception, "having no really formidable competitor to compare with it in purity of flavour, richness and mellowness of texture, and clear whiteness of curd, extending well up to the rind."

The same criticism applies to the Truckles.

Scotch and English judges do not seem to have a common standard of points in judging Cheddars, and it is pointed out by the judges themselves, as well as by others interested, that the practice of having a Scotch judge and an English judge working together "is a source of the gravest dissatisfaction"; the solution would seem to be in the direction of having separate classes for English and Scotch makes of Cheddar.

Cheshire Cheese was more highly spoken of; one of the judges considering that it was one of the best shows of Cheshire Cheese he had seen at the Agricultural Hall.

In coloured cheeses, the first prize "was of exceptionally fine quality, true in colour, and clean in flavour; the 2nd and 3rd also were well made and of fine quality, and suitable for a London trade."

Uncoloured cheeses came in for very similar praise, and so did the class for 20 cheeses.

Lancashire exhibits, though small in number, "were in good condition, several of them being of fine quality, and the first prize a particularly rich creamy cheese of good flavour."

Stiltons were, generally speaking, of "good quality," most of the exhibits "being ripe and blue," but the judge points out one general fault, which he thinks was due to the wet and cold season, viz., discolouration, which "though not affecting the flavour, takes away from the appearance when cut, and lowers the selling value." He suggests the addition of a little more salt to the curd in a cold season.

Wensleydales were " a great improvement upon recent years, though two or three had a Cheddar flavour, which is most objectionable in a Wensleydale cheese, as such cheeses seldom get blue, and are usually too firm in texture to suit the best buyers. The prize winners were " nicely blue, clean in flavour, and true to type."

Gloucesters, both double and single, were pronounced on the whole to be of " excellent quality," and the first prizes went to cheeses in quality, texture, and flavour practically perfect.

Leicesters " were only a fair sample, many of the exhibits were decidedly bitter in flavour, and some showed discolouration."

Derbys, " as a class, were fairly good, though the flavour, as in the Leicesters, was not up to a high standard."

Caerphilly were " a very level lot as regards quality and appearance, the class containing many good exhibits, but there was a tendency on the part of some exhibitors to present cheeses that were really too new."

Cream Cheese (made from pure cream only) contained " many excellent cream cheeses, but some of them were clumsily and shabbily packed." Disappointed exhibitors in this class would have done well " to note the style and finish of the first prize exhibit, which is bound to gain preference both on the show bench and the counter."

A few exhibits were too granular in texture, due to a deficiency of moisture.

Gervais were a small class, but contained " three splendid exhibits, packed in a business-like style, and made true to type."

Unripened soft cheese " included many exhibits of merit. Coulommier-shaped curd cheeses were conspicuous, and many were exceedingly well made, and possessed a wonderfully clean flavour." " Here again many exhibits were shown in packages quite unsuitable."

Ripened soft cheese on the other hand " was a most disappointing class of only three entries, none of which possessed sufficient merit to gain an award."

Collections of Dairy Produce brought forth only one entry, but this was a fine display, on which some excellent cheeses and other produce could be seen.

In the class for Colonial Dairy Produce, it is to be regretted there was no entry.

Bacon and Hams.

The judge found the general quality of the Bacon class good, but complains of the fewness of exhibits, and suggests that more

competition would probably be evoked if the class was divided into—

1. A class for goods cured in the farm-house.
2. A class for Irish curers.
3. A class for Colonial curers.

Hams were very good indeed, but here again the judge is strongly of opinion that Irish and Colonial hams should have separate classes.

Butter.

In the two classes for Butter made from Channel Island Cattle the judge found "many samples which could *only* be described as *excellent*, though there were also a few in each class of inferior quality." Some half-dozen samples in the "perfectly free from salt" class were disqualified for not fulfilling that condition.

Of two classes for butter made from cattle other than Channel Islands, "the flavour, texture, and appearance of prize butters was very good indeed, and taking the class throughout the flavour with one or two exceptions was good."

The other two classes for Roll Butters (60 and 61) do not receive such satisfactory comment, for though highly praising the prize winners, the judge reports that a good many of the exhibits were of poor quality in texture, flavour, and keeping qualities.

Irish Butter.

It is greatly regretted that the judge of Irish Butter has passed away since the Show; he was of opinion that the packing was much improved and the quality generally good, some excellent samples being staged.

Colonial Butter.

The salted class was considered a good improvement on the exhibit which came before the same judge two years ago, there being an absence of really bad butter, and the bulk of the exhibits being of good standard quality, which is brought out by the fact that more than half of them obtained 92 points and over.

In the Fresh Butter class the points obtained were not nearly as high, the texture being most at fault.

Cream.

Some good exhibits were shown in the Clotted Cream class, but "several had been spoiled by mismanagement in heating the cream." Cream other than clotted was for the most part good, but some samples "had been taken off too thick for practical purposes, and others had lost flavour by being kept to thicken; the thickest samples were generally inferior in flavour."

Skim-milk Bread and Scones.

Class 72 (white bread, two loaves), 32 entries; "the class as a whole was really first class both in numbers and quality."

Class 73 (brown bread, two loaves), 31 entries, when cut were not as good and even in quality as they appeared at first; about a dozen good exhibits.

Class 74, fancy bread, a good class for quality.

In Class 75, home-made bread, the judge found a great improvement in quality over previous exhibitions, and

Class 76, scones, was exceptionally good, no less than five exhibits being very nearly equal for first prize honours.

Honey.

"Owing to adverse weather, bee-keepers had a very poor harvest in most parts of the country, and consequently the number of entries in the honey classes was lower than usual. There were, however, some very fine specimens of honey exhibited, especially in the classes for Extracted Honey. All the exhibits were very nicely staged and in a good position, making an attractive display."

Butter-making Contests.

Comments by the judges on the various competitions vary in the matter of praise given.

Class 97 "was a very weak class, the work not excellent, and the time taken much too long."

Class 98a "was, on the whole, very good, but more attention should be given to the granular condition of the butter, and more care taken in the working; several competitors handled otherwise firm butter rather roughly, causing it to cut soft and greasy."

Class 98b. "Mostly good workers," but the best easily came to the front."

Class 98c. "The work was of average quality, but not brilliant."

Class 98. "The contest was very keen and good as there were only a few marks between the first and the last."

Class 99. "The contest was very keen and good as there were only a few marks between the first and the last."

Championship. "Several of the candidates were rather unfortunate in getting poor grain; the 1st, 2nd, and 3rd prize winners did excellent work throughout."

Milkers' Contests.

In these contests the work done by the women and girls came in for far more approval by the judge than that done by the men, who considered the work of the latter disappointing.

Inventions.

Of the Railway Milk Churns, the judges say: "None of the churns competing for the prizes offered by the Lord Mayor and Corporation of London, showed any special new features of real practical importance, although most of the churns were of excellent workmanship and finish, and, therefore, the first and second prizes were divided between the best two. It is a somewhat difficult matter to turn out a really first-class Railway Milk Churn to suit the general condition of the milk trade, but the judges are of opinion that the resources of mechanical genius are not yet exhausted in this direction. We are of opinion that the best pattern Railway Milk Churn is one which has a dust-proof lid without any openings. The so-called 'ventilation' holes on the lids of some churns are useless for the purposes of aeration, while they allow the entrance of dirt of all kinds in transit. If milk is quite clean and properly cooled it will keep longer and better in vessels with closely fitted lids and certainly none but clean and well cooled milk should be sent out."

Of the Diabolo Separator the following is the report:—"We thoroughly examined the Diabolo Separator, and had its working explained to us by the gentleman in charge of the stand. We did not consider it necessary to 'test' it, because any and every separator now in the market removes all the fat out of the milk down to decimals of a percentage, and it is not necessary to keep on repeating trials of this kind."

There were other two similar separators exhibited by other firms, but we did not consider either these or the "Diabolo" showed distinct and practical improvement sufficient to warrant any award.

THE MILKING TRIALS OF 1909.

By Fred J. Lloyd, F.C.S.

The Milking Trials, which are yearly growing in popularity, were carried out on the same lines as in former years.

There were originally 152 entries, but of these only 114 were present, and as in the evening one of the milkers failed to have the milk sampled, only 113 animals were actually tested throughout. There were in addition 23 goats. Thus, 137 animals went through the test, as compared with 118 in 1908. It is the largest number that has ever been tested, and the work of analysing the 274 samples of milk taken on Wednesday by 4 p.m. on Thursday was far from easy. To facilitate this, the cows were milked at 6-30 a.m. and 5-30 p.m., instead of 6 p.m. as heretofore, and this arrangement must be adopted in future if the Milking Trials retain their popularity.

The awards are decided by the number of points gained by each animal:

One point is allowed for every pound of milk yielded per day, taking the average of two days.

Twenty points for every pound of butter fat produced, as calculated from the analysis.

Four points for every pound of solids other then fat, similarly calculated.

One point for every 10 days since calving between the 40th and 160th day. 12 points being the maximum allowance for any longer period.

Should the fat fall below 3 per cent., or the solids other than fat below 8·5 per cent., then 10 points are deducted for each such deficiency.

These are the conditions of judging which have been adopted for some years past. They have worked well, and, so far as can be seen, require no amending. They afford to every exhibitor an absolute figure by which to estimate the capabilities of his cow, and at the same time enable him to compare her with other cows of her breed. They afford a clear indication of her value, whether for milk production, for butter making, or for cheese making. The exhibitor can tell whether she is a cow whose offspring are likely to be good milkers or of good milking strain, whether they should be sold or are better worth rearing, and by entering the animal for these Trials year after year he may obtain a most valuable record wherewith to enhance the value of her calves.

The cows are milked out on Tuesday evening before the stewards. They are milked at 6-30 a.m. on Wednesday, and the

milk weighed and sampled. This is repeated in the evening at 5-30. On Thursday the milk is weighed morning and evening. Meantime the analyses have been completed, and the calculation of results begins. These calculations took the judges twelve hours of solid hard work.

The results of this work are set out in full in the tables appended hereto.

Arising out of these tables there are a few points which deserve special attention.

The Standards.

It was decided some years ago that no award should be given to any animal which did not come up to a standard for her class, and these standards were fixed *pro tem.* They have been changed once or twice since, and I purpose in the first place to enquire into the present standards.

Evidently it is of the greatest importance that these standards should be so fixed as to be equally favourable to every breed. In Table I. will be seen the present standard for each breed, and the results of the tests in 1909 as judged by this standard; also the results obtained in previous years when the same standard was in use. Have we arrived as yet at a just standard for each breed? To try and answer this question I have in the table shown the number of animals tested, the number which have come up to the standard, and what percentage these form of the whole. A study of this last column reveals the fact that the standards in some breeds are still too high. If in some breeds 50 per cent. can pass the standard, and in others only 20 per cent., evidently there must be something wrong in these latter cases. It would thus seem imperative that the standards should be revised. If we take 50 per cent. of the tested animals as a fair proportion of those which should be capable of passing the breed standard, then it is evident this standard will have to approximate the average of the points gained by competing cows. Judged from this point of view, it is seen that the present standards are too high in the case of Lincoln Red Shorthorns, Jerseys, and Red Polls.

As there were no Ayrshires competing at the Show in 1909, I have gone back to 1908 to get the average of points for this breed, and find that for the six cows tested this was only 62·6. No wonder that in that year, with a standard of 90, there was no award, and probably a further result of this high standard is the absence of any Ayrshires from the 1909 Show.

In the same way I have averaged the points gained by the six Dexters shown in 1908, and find the average to be 66·8 points, conclusively proving that our present standard of 75 is too high.

TABLE I.—SHOWING THE NUMBER OF COWS COMING UP TO THE STANDARD.

	1909				Previous Results with this Standard				
	Standard	Tested	Above Standard	Average Points	Years	No. of Years	Number Tested	Above Standard	Per centage above Standard
Shorthorns, Pedigree	90	19	14	97·5	1903–5 and 1908	4	36	18	50
Shorthorns, Non Pedigree	110	13	6	108·4	1906–7 and 1908	3	56	23	41
Lincoln Red Shorthorns	100	7	2	*94·6	1908	1	9	2	22
Jerseys	95	23	9	88·6	1903–1908	6	86	31	36
Guernseys	85	6	—	73·3	1906–1908	3	16	8	50
Red Polls	90	8	2	86·4	1903–1908	6	55	13	24
Ayrshires	90	—	—	—	1906–1908	3	12	1	8
Kerries	75	2	1	—	1903–1908	6	35	17	50
Dexters	75	—	—	—	1903–1908	6	20	4	20
South Devons	100	5	2	93·7	1906	1	5	3	60
		83	36						

* Excluding the First Prize winner, which was a very exceptional animal.

It may be said that to take only a few figures is misleading, so I have drawn up Table II., which gives the average points gained by each breed for the last ten years :—

TABLE II.—AVERAGE POINTS GAINED IN THE MILKING TRIALS.

YEAR	Shorthorn Pedigree	Shorthorn Non-Pedigree	Lincoln Reds	Jerseys	Guernseys	Red Polls	Ayrshires	Kerries	Dexters	South Devons
1909	97·5	108·4	94·6	88·6	73·3	86·4	......	......	......	93·7
1908	99·5	103·6	95·7	82·3	80·7	74·1	62·6	74·3	66·8	......
1907	94·6	102·4	103·6	86·9	84·6	90·6	54·3	91·1	70·5	......
1906	88·0	93·2	......	83·9	83·6	76·5	85·4	81·3	65·8*	111·5
1905	92·1	106·3	......	93·4	78·1	78·5	76·4	67·3	......	......
1904	73·6	101·1	......	91·5	76·1	85·4	51·2	79·5	62·9	......
1903	85·1	111·8	......	84·5	66·4	82·8	......	75·8	......	......
1902	75·6	105·3	......	77·8	66·4	80·0	40·5	62·0	71·6	......
1901	86·0	113·9	......	78·2	77·2	94·0	35·7	82·2	68·0	......
1900	72·4	108·2	......	63·4	80·3	87·5	......	71·1	55·7	......
Average	86·4	105·4	98·0	83·0	76·6	83·6	65·1	76·1	65·9	102·6
Our Present Standard ...	90·	110·	100·	95·	85·	90·	90·	75·	75·	100·

* Two abnormal animals not taken into account.

The results are so interesting that I do not begrudge the time it has taken. It affords a striking illustration of the gradual improvement which has taken place in the Pedigree Shorthorn Cow during the past ten years.

It shows, conclusively, that our standard for the Ayrshires is quite impracticable; but why the Ayrshires in England should give for the seven years when they have been shown such uniformly inferior results *as a class* is a problem worthy of further investigation.

It proves, conclusively, that our standard for Dexters in being placed on the same level as Kerries is opposed to facts. Nearly every year the average of Dexters has been far below that of Kerries, the year 1902 being an exception because there were only two Dexters exhibited, and both of these were far above the average.

A careful study of this table must convince everyone that our standards need to be reconsidered.

Standards for Heifers.

Up to the present there has been no standard for the heifers, but it is now time that at least some preliminary standard should be introduced. What should the standard for each breed be? In his report for last year, Mr. Whitley considered how two-thirds the standard for the cows of the same breed would work out. He gave figures to show what the results would have been for the years 1906-08, which were as follows:—

Heifers	2/3 Cow Standard	No. of Heifers Entered	Above 2/3 Cow Standard	Average Points Gained
Shorthorns, Pedigree ..	60	19	6	54·2
Do. Non-Pedigree	75	19	6	69·3
Red Polled	60	21	7	54·6

The results obtained this year when tested by this same proposed standard would give the following results :—

	2/3 Cow Standard	Number of Heifers Tested	Up to Standard
Shorthorn, Pedigree	60	13	3
Do. Non-Pedigree.. ..	75	10	3
Red Polled	60	7	3

I think it will be evident that this year, as in former years, this proposed standard is too high. It would be better to be guided by the average points actually obtained. These were as follows :—

Points Gained by Heifers.

	Shorthorn, Pedigree	Shorthorn, Non-Ped.	Red Polls
1906	60·6	64·4	50·0
1907	47·3	70·8	55·3
1908	54·8	72·8	58·5
1909	53·3	69·7	59·9
Average ..	54·0	69·4	55·9

From these figures it would seem that the standard for Heifers might now be fixed at 55 for Shorthorns, Pedigree ; 70 for Shorthorns, Non-Pedigree ; and 55 for Red Polls.

I therefore suggest that for the Dairy Show of 1910 the standards be as under :—

	Cows		Heifers
Shorthorns, Pedigree	90	....	55
Shorthorns, Non-Pedigree ..	105	....	70
Lincoln Red Shorthorns.. ..	95	....	—
Jerseys	90	....	—
Guernseys	80	....	—
Red Polls	85	....	55
Ayrshires	70	....	—
Kerries	75	....	—
Dexters	65	....	—
South Devons	100	....	—

The Quality of the Milk.

We now pass to a consideration of the quality of the milk yielded by the competing animals. Table III. shows this for the past five years. The composition for preceding years will be found in the Report for 1908. In conjunction with this table we may also study Table IV., which shows the number of samples of milk which contained less than 3 per cent. of fat or 8·5 per cent. of other solids.

On the whole the milk was of very good quality, especially that yielded by the cows, and I am inclined to attribute this to the genial weather which prevailed, thus calling for a minimum expenditure of food to maintain the body heat of the animals. This improved quality was obtained without any apparent diminution in quantity.

I would strongly advise dairy students to carefully study this table. It appears to me to give a fair idea of the average yield of cows of the various breeds, of the differences in quantity and quality between the morning's and evening's milkings, of the relative yields of heifers and cows, and a comparison of their respective milks, all points on which at present there seem very conflicting views taught.

TABLE III.—QUANTITY AND QUALITY OF MILK, 1906–1909.

BREED	Year	No. of Cows	Average Weight of Milk		Total Weight of Milk	Percentage Composition of Milk					
						Fat		Solids not Fat		Total Solids	
			Morn.	Even.		Morn.	Even.	Morn.	Even.	Morn.	Even.
Shorthorns, Pedigree.. ..	1906	11	23·9	22·8	46·7	3·26	3·46	8·91	8·95	12·17	12·41
	1907	17	24·2	23·7	47·9	3·14	3·98	9·02	8·88	12·16	12·86
	1908	15	24·2	24·0	48·2	3·26	3·88	9·18	8·84	12·44	12·72
	1909	19	23·2	22·1	45·3	3·43	4·27	8·98	8·80	12·41	13·07
Do. do. (Heifers)	1906	3	14·8	13·9	28·7	3·64	4·10	9·46	9·11	13·10	13·21
	1907	7	11·7	11·4	23·1	3·7	3·60	9·16	9·37	12·86	12·97
	1908	9	16·1	16·6	32·7	2·70	3·36	9·20	8·95	11·90	12·31
	1909	13	14·3	13·4	27·7	3·49	3·74	9·24	9·06	12·73	12·80
Shorthorns, Non-Pedigree	1906	15	23·7	23·6	47·3	3·34	3·82	8·83	8·72	12·17	12·54
	1907	22	25·8	25·0	50·5	3·37	3·72	8·95	8·90	12·32	12·62
	1908	19	26·3	24·9	51·2	3·66	4·00	9·04	8·73	12·70	12·73
	1909	13	27·2	25·6	52·8	3·54	4·37	8·99	8·77	12·53	13·14
Do. do. (Heifers)	1906	7	16·0	15·3	31·3	3·41	3·95	9·10	9·05	12·51	13·00
	1907	8	18·8	17·7	36·5	3·28	3·54	9·24	9·24	12·52	12·78
	1908	4	17·8	16·9	34·7	3·80	3·74	9·29	9·12	13·09	12·86
	1909	10	18·7	17·6	36·3	3·04	3·69	9·26	9·03	12·30	12·72
LincolnshireRed Shorth'ns	1907	7	27·1	24·7	51·8	3·28	3·55	8·95	8·95	12·23	12·50
	1908	9	24·8	23·9	48·7	3·24	3·93	8·84	8·70	12·08	12·63
	1909	7	25·0	23·5	48·5	3·14	4·59	9·06	8·90	12·20	13·49
Jerseys	1906	13	17·1	16·0	33·1	4·69	4·81	9·34	9·32	14·03	14·13
	1907	12	18·0	16·9	34·9	4·51	5·68	9·25	9·09	13·76	14·77
	1908	16	17·4	16·8	34·2	4·07	4·91	9·32	8·99	13·39	13·90
	1909	23	17·7	16·6	34·3	4·85	5·76	9·44	9·09	14·29	14·85
Guernseys	1906	6	17·9	16·6	34·5	4·33	4·51	9·31	9·26	13·64	13·77
	1907	5	17·4	18·3	35·7	4·58	4·60	9·39	9·30	13·97	13·90
	1908	5	17·5	16·1	33·6	4·49	4·88	9·08	8·76	13·57	13·64
	1909	6	16·0	13·3	29·3	4·81	5·08	9·40	9·11	14·21	14·19
Red Polls	1906	11	18·9	18·5	37·4	3·10	3·60	9·15	8·89	12·25	12·49
	1907	8	21·9	19·6	41·5	3·58	3·67	8·84	8·91	12·42	12·58
	1908	9	18·6	17·9	36·5	3·44	3·56	9·20	8·98	12·64	12·54
	1909	8	21·0	19·6	40·6	3·36	3·85	9·17	9·06	12·53	12·91
Do. (Heifers)	1906	9	14·5	14·2	28·7	2·79	3·22	9·32	9·22	12·11	12·44
	1907	8	14·2	13·3	27·5	3·76	3·52	9·14	9·07	12·90	12·59
	1908	4	14·6	13·8	28·4	3·53	3·57	9·25	9·16	12·78	12·73
	1909	7	13·7	12·5	26·2	4·04	3·87	9·42	9·31	13·46	13·18
Ayrshires	1906	3	22·2	20·3	42·5	3·57	3·56	9·01	9·03	12·58	12·59
	1907	3	16·9	16·6	33·5	3·16	3·62	8·89	8·81	12·05	12·43
	1908	6	20·2	19·6	39·8	2·71	3·55	8·82	8·52	11·53	12·07
South Devons	1906	5	25·1	23·2	48·3	3·44	4·01	9·27	9·15	12·71	13·16
	1909	5	20·3	19·8	40·1	3·80	4·51	9·17	8·94	12·97	13·45
Kerries	1906	5	18·8	17·7	36·5	4·17	4·34	9·20	9·23	13·37	13·57
	1907	5	20·5	19·8	40·3	3·88	4·73	9·07	8·89	12·95	13·62
	1908	6	19·0	15·8	34·8	3·81	3·68	9·09	8·84	12·90	12·50
	1909	2	15·1	14·3	29·4	3·93	5·14	9·27	8·79	13·20	13·93

TABLE IV.—NUMBER OF ANIMALS YIELDING MILK DEFICIENT IN FAT OR OTHER SOLIDS.

	Less than 3 per cent. of Fat				Less than 8·5 per cent. other Solids			
	1906	1907	1908	1909	1906	1907	1908	1909
Cows								
Shorthorns, Pedigree	4	8	4	2	1	2	2	1
Do. Non-Pedigree ..	4	8	4	3	3	0	4	4
Lincoln Red Shorthorns ..	0	3	4	3	0	0	1	0
Jerseys	0	0	1	1	0	0	0	0
Guernseys	0	0	0	0	0	0	1	0
Red Polls	3	1	2	2	0	0	1	0
Kerries	0	0	0	0	0	0	1	0
South Devons	1	0	0	0	0	0	0	0
Total	12	20	15	11	4	2	10	5
HEIFERS								
Shorthorns, Pedigree	1	2	6	4	0	1	1	2
Do. Non-Pedigree ..	1	3	0	4	1	0	0	0
Red Polls	5	2	1	0	0	1	0	0

Class 1.—PEDIGREE SHORTHORN COWS.

Number	1		2		3		4	
Name	Lady Coquette		Heather Queen 3rd		Darlington Cranford 5th		Dorothy	
Age	7 yr. 9 m. 2 w.		8 yr. 1 m. 2 dys.		11 yr. 10 m. 1 w.		8 yr. 4 m. 1 w.	
Number of Calves	—		—		8		6	
Last Calved	Sept. 9.		Aug. 27.		May 27.		July 25.	
Days since Calving	27		40		132		73	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	28·0	26·5	19·4	21·9	27·8	24·7	36·3	29·5
Weight of Milk, 2nd day	31·6	26·0	22·3	22·4	28·8	24·6	38·7	30·7
Average	29·8	26·2	20·8	22·1	28·3	24·6	37·5	30·1
Percentage Composition of the Milk. — Fat	3·20	3·57	4·03	4·66	3·36	3·53	1·42	2·74
Percentage Composition of the Milk. — Solids other than Fat	9·16	9·07	8·89	8·82	8·76	8·77	8·94	9·14
Percentage Composition of the Milk. — Solids	12·36	12·64	12·92	13·48	12·12	12·30	10·36	11·88
Actual weight of Fat, in lbs.	·96	·93	·83	1·03	·95	·57	·53	·83
Calculation of Points multiply by 20	19·2	18·6	16·6	20·6	19·0	17·4	10·6	16·6
Actual weight of Solids other than Fat, in lbs	2·72	2·38	1·85	1·95	2·48	2·16	3·35	2·76
Calculation of Points multiply by 4	10·88	9·52	7·40	7·80	9·92	8·64	13·40	11·04
Points — For time since Calving	—		—		9·2		3·3	
Points — For weight of Milk	56·0		42·9		52·9		67·6	
Points — For weight of Fat	37·8		37·2		36·4		27·2	
Points — For weight of Solids other than Fat	20·4		15·2		18·6		24·4	
Total	114·2		95·3		117·1		122·5	
Deductions	—		—		—		20·0	
Points gained	114·2		95·3		117·1		102·5	
Remarks and Awards	Reserve		Commendation		2nd Prize.		High Commendation	

CLASS 1.—PEDIGREE SHORTHORN COWS—*Continued.*

Number	5		6		7		9	
Name	Empress 2nd		Spotless 23rd		Provider's Welcome		Frantic	
Age	10 yr. 5 m.		9 yr. 5 m.		5 yr. 4 m. 2 w.		3 yr. 11 m. 1 w.	
Number of Calves	6		7		2		—	
Last Calved	Aug. 26.		Aug. 24.		Sept.		Aug. 9.	
Days since Calving	41		43		—		58	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	21·6	18·2	26·2	22·2	20·2	21·2	14·6	15·0
Weight of Milk, 2nd day	21·8	19·1	25·4	22·9	21·6	21·8	16·5	17·1
Average	21·7	18·6	25·8	22·5	20·9	21·5	15·5	16·0
Percentage Composition of the Milk. — Fat	3·01	3·38	4·03	4·81	3·18	4·40	4·31	4·86
Percentage Composition of the Milk. — Solids other than Fat	8·99	9·06	9·19	9·09	9·52	9·30	9·43	9·10
Percentage Composition of the Milk. — Solids	12·00	12·44	13·22	13·90	12·70	13·70	13·74	13·96
Actual weight of Fat, in lbs.	·66	·63	1·04	1·08	·66	·95	·67	·78
Calculation of Points multiply by 20	13·2	12·6	20·8	21·6	13·2	19·0	13·4	15·6
Actual weight of Solids other than Fat, in lbs	1·95	1·68	2·32	2·03	2·0	2·01	1·46	1·46
Calculation of Points multiply by 4	7·80	6·72	9·28	8·12	8·0	8·04	5·84	5·84
Points — For time since Calving	·1		·3		—		1·8	
Points — For weight of Milk	40·3		48·3		42·4		31·5	
Points — For weight of Fat	25·8		42·4		32·2		29·0	
Points — For weight of Solids other than Fat	14·5		17·4		16·0		11·7	
Total	80·7		108·4		90·6		74·0	
Deductions	—		—		—		—	
Points gained	80·7		108·4		90·6		74·0	
Remarks and Awards			High Commendation		Commended			

CLASS 1.—PEDIGREE SHORTHORN COWS—*Continued.*

Number	11		12		13		15	
Name	Bendyshe Belle		Ewerby Red Rose 2nd		Lady Lee 21st		Eaglethorpe Amy 5th	
Age	3 yr. 8 m. 1 w.		5 yr. 6 m. 1 w.		7 yr. 8 m.		5 yr. 1 m. 2 w.	
Number of Calves	—		2		—		—	
Last Calved	Sept. 6.		Sept. 17		July 4.		June 10.	
Days since Calving	30		19		94		118	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	18.5	16·1	19·2	18·1	23·6	22·1	23·6	20·1
Weight of Milk, 2nd day	18·1	16.2	20·4	16·5	27·5	24·0	23·0	19·7
Average	18·3	16·1	19·8	17·3	25·5	23·0	23·3	19·9
Percentage Composition of the Milk. Fat	3·37	4·05	3·79	4·60	3·00	3·00	3·00	3·54
Percentage Composition of the Milk. Solids other than Fat	9·29	9·19	8·89	8·50	9·54	8·92	8·74	8·58
Percentage Composition of the Milk. Solids	12·66	13·24	12·68	13·10	12·54	11·92	11·74	12·12
Actual weight of Fat, in lbs.	·62	·65	·75	·80	·76	·69	·70	·71
Calculation of Points multiply by 20	12·4	13·0	15·0	16·0	15·2	13·8	14·0	14·2
Actual weight of Solids other than Fat, in lbs	1·70	1·47	1·76	1·47	2·44	2·05	2·04	1·71
Calculation of Points multiply by 4	6·8	5·88	7·04	5·88	9·76	8·20	8·16	6·84
Points: For time since Calving	—		—		5·4		7·8	
Points: For weight of Milk	34·4		37·1		48·5		43·2	
Points: For weight of Fat	25·4		31·0		29·0		28·2	
Points: For weight of Solids other than Fat	12·7		12·9		18·0		15·0	
Total	72·5		81·0		100·9		94·2	
Deductions	—		—		—		—	
Points gained	72·5		81·0		100·9		94·2	
Remarks and Awards					High Commendation		Commendation	

Class 1.—PEDIGREE SHORTHORN COWS—*Continued.*

Number ..	17		18		19		22	
Name ..	Ellesmere Princess 2nd		Ring		Cranford Beauty		Darlington Cranford 6th	
Age ..	12 yr 3 m 2 w		6 yr 7 m 1 w		5 yr 8 m 1 w		8 yr 7 m 2 w	
Number of Calves ..	—		—		—		—	
Last Calved ..	June 17		Aug. 19		Sept. 4		July 30	
Days since Calving ..	111		48		32		68	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ..	25·4	23·7	15·9	21·6	28·9	26·5	28·0	25·7
Weight of Milk, 2nd day ..	26·4	23·3	10·9	17·5	27·4	25·9	29·7	22·4
Average ..	25·9	23·5	13·4	19·5	28·1	26·2	28·8	24·0
Percentage Composition of the Milk. — Fat ..	3·05	3·92	2·78	6·03	3·08	4·29	3·86	3·92
Percentage Composition of the Milk. — Solids other than Fat ..	8·69	8·68	7·44	8·01	8·98	8·75	8·66	8·68
Percentage Composition of the Milk. — Solids ..	11·74	12·60	10·22	14·04	12·06	13·04	12·52	12·60
Actual weight of Fat, in lbs. ..	·79	·92	·37	1·17	·86	1·12	1·11	·94
Calculation of Points multiply by 20 ..	15·8	18·4	7·4	23·4	17·2	22·4	22·2	18·8
Actual weight of Solids other than Fat, in lbs	2·25	2·04	1·00	1·56	2·50	2·3	2·50	2·08
Calculation of Points multiply by 4 ..	9·0	8·16	4·0	6·24	10·0	9·2	10·0	8·32
Points — For time since Calving ..	7·1		·8		—		2·8	
Points — For weight of Milk ..	49·4		32·9		54·3		52·8	
Points — For weight of Fat ..	34·2		30·8		39·6		41·0	
Points — For weight of Solids other than Fat	17·2		10·2		19·2		18·3	
Total ..	107·9		74·7		113·1		114·9	
Deductions ..	—		30·0		—		—	
Points gained	107·9		44·7		113·1		114·9	
Remarks and Awards ..	High Commendation				High Commendation		3rd Prize	

CLASS 1.—PEDIGREE SHORTHORN COWS—*Continued*

Number	23		24		25	
Name	Pear Drop		Lady Heggle		Cherry Star	
Age	9 yr		7 yr		5 yr 9 m 3 w	
Number of Calves	—		—		3	
Last Calved	Sept. 12		Sept. 3		Sept. 15	
Days since Calving	24		33		21	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	24·9	22·2	30·0	24·2	27·9	21·3
Weight of Milk, 2nd day	24·7	22·0	28·0	25·6	19·8	20·9
Average	24·8	22·1	29·0	24·9	23·8	21·1
Percentage Composition of the Milk. — Fat	3·96	5·22	5·40	5·01	4·33	5·51
Percentage Composition of the Milk. — Solids other than Fat	9·26	9·06	8·62	8·59	8·73	8·97
Percentage Composition of the Milk. — Solids	13·22	14·28	14·02	13·60	13·06	14·48
Actual weight of Fat, in lbs.	·98	1·15	1·57	1·25	1·03	1·17
Calculation of Points multiply by 20	19·6	23·0	31·4	25·0	20·6	23·4
Actual weight of Solids other than Fat, in lbs	2·30	2·0	2·5	2·14	2·08	1·9
Calculation of Points multiply by 4	9·2	8·0	10·0	8·56	8·32	7·6
Points — For time since Calving	—		—		—	
Points — For weight of Milk	46·9		53·9		44·9	
Points — For weight of Fat	42·6		56·4		44·0	
Points — For weight of Solids other than Fat	17·2		18·6		15·9	
Total	106·7		128·9		104·8	
Deductions	—		—		—	
Points gained	106·7		128·9		104·8	
Remarks and Awards	High Commendation		1st Prize Reserve for Lord Mayor's Cup		High Commendation	

CLASS 2.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1).

Number	27		29		30		31	
Name	Raspberry		Filpail		Daisy		Millicent	
Age	7 yr		5 yr		6 yr 2 m. 1 w.		7 yr.	
Number of Calves	—		—		—		—	
Last Calved	Sept 15		June 25		Sept. 11		July 5	
Days since Calving	21		103		25		93	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	32·0	25·2	20·9	26·0	29·2	28·4	35·2	28·1
Weight of Milk, 2nd day	28·3	26·7	23·5	24·6	31·2	31·6	28·9	31·0
Average	30·1	25·9	22·2	25·3	30·2	30·0	32·0	29·5
Percentage Composition of the Milk. Fat	4·29	4·79	2·11	4·09	2·71	3·63	3·22	3·00
Percentage Composition of the Milk. Solids other than Fat ..	8·99	8·65	8·81	8·51	8·51	8·29	8·78	8·46
Percentage Composition of the Milk. Solids	13·28	13·44	10·92	12·60	11·22	11·92	12·00	11·46
Actual weight of Fat, in lbs.	1·3	1·24	·47	1·03	·82	1·08	1·03	·88
Calculation of Points multiply by 20 ..	26·0	24·8	9·4	20·6	16·4	21·6	20·6	17·6
Actual weight of Solids other than Fat, in lbs	2·7	2·24	1·95	2·15	2·57	2·50	2·8	2·5
Calculation of Points multiply by 4 ..	10·8	8·96	7·8	8·6	10·28	10·0	11·2	10·0
Points: For time since Calving	—		6·3		—		5·3	
Points: For weight of Milk	56·0		47·5		60·2		61·5	
Points: For weight of Fat	50·8		30·0		38·0		38·2	
Points: For weight of Solids other than Fat	19·8		16·4		20·3		21·2	
Total	126·6		100·2		118·5		126·2	
Deductions ..	—		10·0		20·0		10·0	
Points gained	126·6		90·2		98·5		116·2	
Remarks and Awards	3rd Prize Reserve Spencer Challenge Cup						Reserve	

CLASS 2.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number ..	32		33		34		36	
Name ..	Minerva		Mamie		Daisy		Mer y Maid	
Age ..	4 yr.		6 yr.		7 yr.		5 yr.	
Number of Calves ..	—		—		—		—	
Last Calved ..	Sept. 15.		Sept. 16.		June 16.		Aug. 31.	
Days since Calving ..	21		20		112		36	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day ..	23·3	23·1	30·7	31·1	37·1	28·6	22·2	23·9
Weight of Milk, 2nd day ..	23·7	23·2	34·0	31·0	32·4	29·4	27·1	23·6
Average ..	23·5	23·1	32·3	31·0	34·7	29·0	24·6	23·7
Percentage Composition of the Milk. — Fat ..	1·99	2·46	3·93	4·51	3·85	3·72	3·65	4·56
Percentage Composition of the Milk. — Solids other than Fat ..	9·09	8·88	9·45	9·01	9·29	9·18	9·15	9·00
Percentage Composition of the Milk. — Solids ..	11·08	11·34	13·38	13·52	13·14	12·80	12·80	13·56
Actual weight of Fat, in lbs. ..	·47	·57	1·27	1·40	1·33	1·08	·90	1·08
Calculation of Points multiply by 20 ..	9·4	11·4	25·4	28·0	26·6	21·6	18·0	21·6
Actual weight of Solids other than Fat, in lbs	2·13	2·06	3·05	2·80	3·22	2·68	2·25	2·14
Calculation of Points multiply by 4 ..	8·52	8·25	12·2	11·2	12·88	10·72	9·0	8·56
Points — For time since Calving ..	—		—		7·2		—	
Points — For weight of Milk ..	46·6		63·3		63·7		48·3	
Points — For weight of Fat ..	20·8		53·4		48·2		39·6	
Points — For weight of Solids other than Fat	16·8		23·4		23·6		17·6	
Total ..	84·2		140·1		142·7		105·5	
Deductions ..	20·0		—		—		—	
Points gained	64·2		140·1		142·7		105·5	
Remarks and Awards ..			2nd Prize.		1st Prize Reserve Barham Cup.			

CLASS 2.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number	37		38		40		44	
Name	Heather Bloom		Red Rose 3rd		Buttercup		Sunflower	
Age	Unknown.		7 yr.		8 yr.		6 yr.	
Number of Calves	3		—		—		—	
Last Calved	June 25.		July 29.		Sept. 20.		Sept. 20.	
Days since Calving	103		69		16		16	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	18·2	25·4	28·1	20·5	28·7	26·6	25·2	23·9
Weight of Milk, 2nd day	23·2	23·0	23·5	20·2	25·7	26·1	25·4	21·6
Average	20·7	24·2	25·8	20·3	27·2	26·3	25·3	22·7
Percentage Composition of the Milk. Fat	3·23	5·43	3·96	5·10	4·38	5·26	5·07	5·13
Percentage Composition of the Milk. Solids other than Fat	9·11	9·03	8·48	8·34	8·68	8·34	9·37	9·31
Percentage Composition of the Milk. Solids	12·34	14·46	12·44	13·44	13·06	13·60	14·44	14·44
Actual weight of Fat, in lbs.	·67	1·31	1·02	1·02	1·2	1·38	1·28	1·16
Calculation of Points multiply by 20	13·4	26·2	20·4	20·4	24·0	27·6	25·6	23·2
Actual weight of Solids other than Fat, in lbs	1·88	2·20	2·18	1·70	2·35	2·20	2·37	2·11
Calculation of Points multiply by 4	7·52	8·8	8·72	6·8	9·4	8·8	9·48	8·44
Points: For time since Calving	6·3		2·9		—		—	
Points: For weight of Milk	44·9		46·1		53·5		48·0	
Points: For weight of Fat	39·6		40·8		51·6		48·8	
Points: For weight of Solids other than Fat	16·3		15·5		18·2		17·9	
Total	107·1		105·3		123·3		114·7	
Deductions	—		20·0		10·9		—	
Points gained	107·1		85·3		113·3		114·7	
Remarks and Awards					High Commendation.		High Commendation.	

CLASS 2.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number	46	
Name	Elsie	
Age	5 yr. 3 m.	
Number of Calves	3	
Last Calved	Sept. 12	
Days since Calving	24	
	Morn.	Even.
Weight of Milk, 1st day	25·3	22·4
Weight of Milk, 2nd day	24·8	22·2
Average	25·0	22·3
Percentage Composition of the Milk. Fat	3·63	5·12
Percentage Composition of the Milk. Solids other than Fat	9·11	9·08
Percentage Composition of the Milk. Solids	12·74	14·20
Actual weight of Fat, in lbs.	·90	1·14
Calculation of Points multiply by 20	18·0	22·8
Actual weight of Solids other than Fat, in lbs	2·28	2·02
Calculation of Points multiply by 4	9·12	8·08
Points: For time since Calving	—	
Points: For weight of Milk	47·3	
Points: For weight of Fat	40·8	
Points: For weight of Solids other than Fat	17·2	
Total	105·3	
Deductions	—	
Points gained	105·3	
Remarks and Awards		

CLASS 3.—LINCOLNSHIRE RED SHORTHORN COWS.

Number	49		50		51		52	
Name	Bracebridge Fulletby		Cadeby Belle		Bracebridge No. 26th		Burton Quality 5th	
Age	9 yr.		7 yr.		5 yr. 6 m.		4 yr. 8 m.	
Number of Calves	5		5		3		2	
Last Calved	Sept. 9.		June 10.		Aug. 2.		Aug. 25.	
Days since Calving	27		118		65		42	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	13·9	24·1	20·4	18·9	24·0	22·1	20·5	21·6
Weight of Milk, 2nd day	26·6	24·8	23·7	18·6	25·2	21·5	21·4	20·0
Average	20·2	24·4	22·0	18·7	24·6	21·8	20·9	20·8
Percentage Composition of the Milk. — Fat	2·34	7·10	3·13	4·13	2·96	3·54	3·41	4·58
Percentage Composition of the Milk. — Solids other than Fat ..	9·36	8·74	8·71	8·63	9·18	9·32	8·95	8·72
Percentage Composition of the Milk. — Solids	11·70	15·84	11·84	12·76	12·14	12·86	12·36	13·30
Actual weight of Fat, in lbs.	·47	1·73	·69	·77	·73	·99	·71	·95
Calculation of Points multiply by 20 ..	9·4	34·6	13·8	15·4	14·6	19·8	14·2	19·0
Actual weight of Solids other than Fat, in lbs	1·90	2·12	1·91	1·62	2·25	2·02	1·87	1·82
Calculation of Points multiply by 4 ..	7·6	8·48	7·64	6·48	9·0	8·08	7·48	7·28
Points — For time since Calving	—		7·8		2·5		·2	
Points — For weight of Milk	44·6		40·7		46·4		41·7	
Points — For weight of Fat	44·0		29·2		34·4		33·2	
Points — For weight of Solids other than Fat	16·1		14·1		17·1		14·8	
Total	104·7		91·8		100·4		89·9	
Deductions ..	10·0		—		10·0		—	
Points gained	94·7		91·8		90·4		89·9	
Remarks and Awards								

Class 3.—LINCOLNSHIRE RED SHORTHORN COWS—*Continued.*

Number	54		55		56	
Name	Burton Nancy 5th		Burton Ruddy 5th		Burton Spotted 5th	
Age	7 yr. 6 m.		7 yr. 11 m.		6 yr. 6 m.	
Number of Calves	6		5		5	
Last Calved	Sept. 8.		Sept. 17.		Sept. 13.	
Days since Calving	28		19		23	
	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	33·5	29·6	25·9	23·6	31·1	28·6
Weight of Milk, 2nd day	33·5	28·2	27·2	24·7	23·5	23·6
Average	33·5	28·9	26·5	24·1	27·3	26·1
Percentage Composition of the Milk. — Fat	4·49	5·23	2·60	3·47	3·07	4·06
Percentage Composition of the Milk. — Solids other than Fat	8·79	8·61	9·22	9·03	9·23	9·26
Percentage Composition of the Milk. — Solids	13·28	13·84	11·82	12·50	13·30	13·32
Actual weight of Fat, in lbs.	1·50	1·51	·69	·84	·84	1·06
Calculation of Points multiply by 20	30·0	30·2	13·8	16·8	16·8	21·2
Actual weight of Solids other than Fat, in lbs	2·95	2·50	2·45	2·18	2·52	2·42
Calculation of Points multiply by 4	11·8	10·0	9·8	8·72	10·08	9·68
Points — For time since Calving	—		—		—	
Points — For weight of Milk	62·4		50·6		53·4	
Points — For weight of Fat	60·2		30·6		38·0	
Points — For weight of Solids other than Fat	21·8		18·5		19·8	
Total	144·4		99·7		111·2	
Deductions	—		10·0		—	
Points gained	144·4		89·7		111·2	
Remarks and Awards	1st Prize; Barham C. Cup; Lord Mayor's Cup				2nd Prize.	

Class 4.—PEDIGREE SHORTHORN HEIFERS (not exceeding Three Years).

Number	57		59		60		61	
Name	Babraham Lorna		Babraham Doreen		Ivy		Frosty 16th	
Age	2 yr. 9 m. 2 w.		2 yr. 7 m. 2 w.		2 yr. 7 m. 1 w.		2 yr. 6 m. 3 w.	
Number of Calves	—		—		—		—	
Last Calved	Sept. 3.		Sept. 11.		June 11.		Aug. 27.	
Days since Calving	33		25		117		40	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day		17·9	16·4	14·0	14·2	12·5	14·0	13·2
Weight of Milk, 2nd day		17·0	15·5	13·9	16·2	12·2	14·6	13·4
Average	18·7	17·4	15·9	13·9	15·2	12·3	14·3	13·3
Percentage Composition of the Milk. Fat	3·00	3·72	3·58	3·89	3·16	2·72	3·45	4·36
Percentage Composition of the Milk. Solids other than Fat	9·14	9·08	9·30	9·37	9·08	9·26	8·65	8·44
Percentage Composition of the Milk. Solids	12·14	12·80	12·88	13·26	12·24	11·98	12·10	12·80
Actual weight of Fat, in lbs.	·56	·64	·57	·54	·48	·33	·49	·58
Calculation of Points multiply by 20	11·2	12·8	11·4	10·8	9·6	6·6	9·8	11·6
Actual weight of Solids other than Fat, in lbs	1·71	1·58	1·48	1·30	1·38	1·14	1·24	1·12
Calculation of Points multiply by 4	6·84	6·32	5·92	5·2	5·52	4·56	4·96	4·48
Points: For time since Calving	—		—		7·7		—	
Points: For weight of Milk	36·1		29·8		27·5		27·6	
Points: For weight of Fat	24·0		22·2		16·2		21·4	
Points: For weight of Solids other than Fat	13·2		11·1		10·1		9·4	
Total	73·3		63·1		61·5		58·4	
Deductions	—		—		10·0		10·0	
Points gained	73·3		63·1		51·5		48·4	
Remarks and Awards	2nd Prize.		3rd Prize.					

CLASS 4.—PEDIGREE SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

Number	63		64		65		66	
Name	Hinxton Belle		Hinxton Rose		Barington Cranford 14th		Primula 6th	
Age	2 yr. 7 m. 4 w.		2 yr. 11 m. 1 w.		2 yr. 11 m. 1 w.		2 yr. 8 m. 2 w.	
Number of Calves	—		—		—		—	
Last Calved	Sept. 21.		Sept. 7.		June 18.		Sept. 2.	
Days since Calving	15		29		110		34	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	20·8	21·6	17·7	14·0	9·8	9·8	12·5	13·5
Weight of Milk, 2nd day	19·0	21·0	17·0	14·6	10·4	10·4	13·6	12·2
Average	19·9	21·3	17·3	14·3	10·1	10·1	13·0	12·8
Percentage Composition of the Milk. — Fat	2·41	2·71	3·86	2·95	4·93	5·01	2·84	4·05
Percentage Composition of the Milk. — Solids other than Fat	9·07	9·13	8·96	8·95	9·73	9·59	9·18	9·15
Percentage Composition of the Milk. — Solids	11·48	11·84	12·82	11·90	14·66	14·60	12·02	13·20
Actual weight of Fat, in lbs.	·48	·57	·67	·42	·50	·51	·37	·52
Calculation of Points multiply by 20	9·6	11·4	13·4	8·4	10·0	10·2	7·4	10·4
Actual weight of Solids other than Fat, in lbs	1·80	1·95	1·55	1·28	·99	·97	1·19	1·17
Calculation of Points multiply by 4	7·2	7·8	6·20	5·12	3·96	3·88	4·76	4·68
Points — For time since Calving	—		—		7·0		—	
Points — For weight of Milk	41·2		31·6		20·2		25·8	
Points — For weight of Fat	21·0		21·8		20·2		17·8	
Points — For weight of Solids other than Fat	15·0		11·3		7·8		9·4	
Total	77·2		64·7		55·2		53·0	
Deductions	20·0		10·0		—		10·0	
Points gained	57·2		54·7		55·2		43·0	
Remarks and Awards	Reserve.							

CLASS 4.—PEDIGREE SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

Number	67		68		69		71	
Name	Nannette		Rugia Niblett		Wild Cran 15th		Star Queen	
Age	2 yr. 5 m.		2 yr. 2 m. 3 w.		2 yr. 11 m.		2 yr. 7 m. 3 w.	
Number of Calves	—		—		—		—	
Last Calved	Sept. 13.		Sept. 5.		Aug. 21.		Aug. 5.	
Days since Calving	23		31		46		62	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	11·9	11·6	8·6	7·8	22·8	21·6	9·9	10·8
Weight of Milk, 2nd day	11·8	10·8	8·0	7·4	22·6	18·9	11·0	11·5
Average	11·8	11·2	8·3	7·6	22·7	19·9	10·4	11·1
Percentage Composition of the Milk. Fat	3·18	3·84	3·88	4·24	3·40	3·46	3·94	4·05
Percentage Composition of the Milk. Solids other than Fat	9·38	9·36	9·36	9·16	9·62	9·14	9·42	8·85
Percentage Composition of the Milk. Solids	12·56	13·20	13·24	13·40	13·02	12·60	13·36	12·90
Actual weight of Fat, in lbs.	·37	·43	·32	·32	·77	·69	·41	·45
Calculation of Points multiply by 20	7·4	8·6	6·4	6·4	15·4	13·8	8·2	9·0
Actual weight of Solids other than Fat, in lbs	1·10	1·05	·69	·70	2·18	1·82	·98	·98
Calculation of Points multiply by 4	4·40	4·20	2·76	2·8	8·72	7·28	3·92	3·92
Points: For time since Calving	—		—		·6		2·2	
Points: For weight of Milk	23·0		15·9		42·6		21·5	
Points: For weight of Fat	16·0		12·8		29·2		17·2	
Points: For weight of Solids other than Fat	8·6		5·6		16·0		7·8	
Total	47·6		34·3		88·4		48·7	
Deductions	—		—		—		—	
Points gained	47·6		34·3		88·4		48·7	
Remarks and Awards					1st Prize.			

CLASS 4.—PEDIGREE SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

Number	72	
Name	Red Lassie	
Age	2 yr. 3 m.	
Number of Calves	—	
Last Calved	Sept. 16.	
Days since Calving	20	
	Morn.	Even.
Weight of Milk, 1st day	8·1	8·6
Weight of Milk, 2nd day	9·6	9·0
Average	8·8	8·8
Percentage Composition of the Milk. — Fat	3·84	3·70
Percentage Composition of the Milk. — Solids other than Fat	9·08	8·30
Percentage Composition of the Milk. — Solids	12·92	12·00
Actual weight of Fat, in lbs.	·34	·32
Calculation of Points multiply by 20	6·8	6·4
Actual weight of Solids other than Fat, in lbs	·80	·73
Calculation of Points multiply by 4	3·20	2·92
Points — For time since Calving	—	
Points — For weight of Milk	17·6	
Points — For weight of Fat	13·2	
Points — For weight of Solids other than Fat	6·1	
Total	36·9	
Deductions	10·0	
Points gained	26·9	
Remarks and Awards		

CLASS 5.—SHORTHORN HEIFERS (NOT EXCEEDING FOUR YEARS).

Number	73		75		76		79	
Name	Dairymaid 2nd		Burton Pride 5th		Burton Cross 4th		Mercia 3rd	
Age	2 yr. 3 m. 3 w.		2 yr. 11 m. 1 w.		2 yr. 9 m.		2 yr. 10 m.	
Number of Calves	—		—		1		—	
Last Calved	Sept. 2.		Sept. 13.		Aug. 5.		Sept. 16.	
Days since Calving	34		23		62		20	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	15·0	16·1	25·5	23·6	16·4	14·3		18·5
Weight of Milk, 2nd day	14·5	15·4	24·5	22·2	16·5	13·8		17·6
Average	14·7	15·7	25·0	22·9	16·4	14·0	18·6	18·0
Percentage Composition of the Milk. Fat	2·00	4·12	2·86	4·09	3·51	3·47	3·02	2·80
Percentage Composition of the Milk. Solids other than Fat ..	9·68	9·16	9·32	9·15	9·01	9·03	8·92	8·90
Percentage Composition of the Milk. Solids	11·68	13·28	12·18	13·24	12·52	12·50	11·94	11·70
Actual weight of Fat, in lbs.	·29	·64	·71	·94	·57	·48	·56	·50
Calculation of Points multiply by 20 ..	5·8	12·8	14·2	18·8	11·4	9·6	11·2	10·0
Actual weight of Solids other than Fat, in lbs	1·42	1·43	2·33	2·10	1·48	1·26	1·66	1·60
Calculation of Points multiply by 4 ..	5·68	5·72	9·32	8·40	5·92	5·04	6·64	6·40
Points: For time since Calving	—		—		2·2		—	
Points: For weight of Milk	30·4		47·9		30·4		36·6	
Points: For weight of Fat	18·6		33·0		21·0		21·2	
Points: For weight of Solids other than Fat	11·4		17·8		11·0		13·0	
Total	60·4		98·7		64·6		70·8	
Deductions ..	10·0		10·0		—		10·0	
Points gained	50·4		88·7		64·6		60·8	
Remarks and Awards			2nd Prize.					

CLASS 5.—SHORTHORN HEIFERS (NOT EXCEEDING FOUR YEARS)—*Continued.*

Number	80		82		83		84	
Name	Maggie		Flora the 1st		Fancy		Dairymaid	
Age	2 yr. 10 m.		2 yr. 10 m. 2 dy.		2 yr. 8 m.		2 yr. 10 m.	
Number of Calves	—		—		—		—	
Last Calved	Sept. 13.		Sept. 13.		Sept. 4.		July 2.	
Days since Calving	23		23		32		96	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day		20·0	14·7	18·2	14·3	15·1	15·8	16·3
Weight of Milk, 2nd day		20·4	17·1	16·7	18·5	13·1	18·3	15·6
Average	21·3	20·2	15·9	17·4	16·4	14·1	17·0	15·9
Percentage Composition of the Milk. Fat	3·65	4·10	3·40	4·42	2·29	2·98	3·32	3·81
Percentage Composition of the Milk. Solids other than Fat ..	9·29	9·16	9·24	8·64	8·97	9·02	8·98	9·05
Percentage Composition of the Milk. Solids	12·94	13·26	12·64	13·06	11·26	12·00	12·30	12·86
Actual weight of Fat, in lbs.	·78	·83	·54	·77	·37	·42	·56	·61
Calculation of Points multiply by 20 ..	15·6	16·6	10·8	15·4	7·4	8·4	11·2	12·2
Actual weight of Solids other than Fat, in lbs.	1·98	1·85	1·47	1·50	1·47	1·27	1·53	1·44
Calculation of Points multiply by 4 ..	7·92	7·40	5·88	6·00	5·88	5·08	6·12	5·76
Points: For time since Calving	—		—		—		5·6	
Points: For weight of Milk	41·5		33·3		30·5		32·9	
Points: For weight of Fat	32·2		26·2		15·8		23·4	
Points: For weight of Solids other than Fat	15·3		11·9		11·0		11·9	
Total	89·0		71·4		57·3		73·8	
Deductions ..	—		—		20·0		—	
Points gained	89·0		71·4		37·3		73·8	
Remarks and Awards	1st Prize.		High Commendation.				Reserve.	

CLASS 5.—SHORTHORN HEIFERS (NOT EXCEEDING FOUR YEARS)—*Continued.*

	85		86	
Number	85		86	
Name	Jessie		Red Rose	
Age	2 yr. 10 m. 3 w.		2 yr. 10 m.	
Number of Calves	—		—	
Last Calved	Sept. 14.		Aug. 20.	
Days since Calving	22		47	
	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	18·3	16·5	23·1	20·6
Weight of Milk, 2nd day	18·4	18·1	23·7	19·6
Average	18·3	17·3	23·4	20·1
Percentage Composition of the Milk. — Fat	3·05	3·91	3·29	3·15
Percentage Composition of the Milk. — Solids other than Fat	8·97	9·09	9·27	9·19
Percentage Composition of the Milk. — Solids	12·02	13·00	12·56	12·34
Actual weight of Fat, in lbs.	·56	·67	·77	·63
Calculation of Points multiply by 20	11·2	13·4	15·4	12·6
Actual weight of Solids other than Fat, in lbs	1·64	1·57	2·18	1·85
Calculation of Points multiply by 4	6·56	6·28	8·72	7·40
Points — For time since Calving	—		·7	
Points — For weight of Milk	35·6		43·5	
Points — For weight of Fat	24·6		28·0	
Points — For weight of Solids other than Fat	12·8		16·1	
Total	73·0		88·3	
Deductions	—		—	
Points gained	73·0		88·3	
Remarks and Awards	High Commendation.		3rd Prize.	

CLASS 6.—JERSEY COWS.

Number	87		89		90		91	
Name	Vanilla 2nd		Primate's Pearl		Mrs. Viola		Lovely Venus	
Age	9 yr. 4 m. 2 w.		4 yr. 10 m. 2½ w.		9 yr. 1 m.		6 yr. 11 m. 3 w.	
Number of Calves	—		1		6		6	
Last Calved	June 17.		May 27.		June 15.		May 1.	
Days since Calving	111		132		113		158	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	17·0	18·8	17·3	16·3	20·5	20·6	23·6	21·3
Weight of Milk, 2nd day	18·0	16·2	18·0	14·4	21·3	20·0	23·5	20·4
Average	17·5	17·5	17·6	15·3	20·9	20·3	23·5	20·8
Percentage Composition of the Milk. — Fat	2·71	4·70	5·56	5·92	3·50	5·37	3·93	4·14
Percentage Composition of the Milk. — Solids other than Fat	9·29	8·50	9·56	9·24	9·26	8·83	9·37	9·16
Percentage Composition of the Milk. — Solids	12·00	13·20	15·12	15·16	12·76	14·20	13·30	13·30
Actual weight of Fat, in lbs.	·47	·82	·80	·91	·73	1·10	·93	·86
Calculation of Points multiply by 20	9·4	16·4	16·0	18·2	14·6	22·0	18·6	17·2
Actual weight of Solids other than Fat, in lbs	1·63	1·48	1·68	1·42	1·93	1·80	2·18	1·90
Calculation of Points multiply by 4	6·52	5·92	6·72	5·68	7·72	7·20	8·72	7·60
Points — For time since Calving	7·1		9·2		7·3		11·8	
Points — For weight of Milk	35·0		32·9		41·2		44·3	
Points — For weight of Fat	25·8		34·2		36·6		35·8	
Points — For weight of Solids other than Fat	12·4		12·4		14·9		16·3	
Total	80·3		88·7		100·0		108·2	
Deductions	10·0		—		—		—	
Points gained	70·3		88·7		100·0		108·2	
Remarks and Awards					High Commendation.		3rd Prize.	

CLASS 6.—JERSEY COWS—*Continued.*

Number	93		94		95		96	
Name	Flying Fox's Electra		Dairymaid		Belle's Browny		Ripple 4th	
Age	7 yr. 3 m. 24 d.		8 yr. 2 m. 2 w.		4 yr. 3 m. 2 w.		6 yr. 1 w.	
Number of Calves	—		—		—		—	
Last Calved	Sept. 15.		May 7.		Aug. 28.		June 27.	
Days since Calving	21		152		39		101	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	26·5	22·1	13·4	14·3	15·6	14·0	16·8	15·6
Weight of Milk, 2nd day	23·3	22·5	16·1	12·9	11·7	11·9	15·7	15·5
Average	24·9	22·3	14·7	13·6	13·6	12·9	16·2	15·5
Percentage Composition of the Milk. Fat	3·67	4·53	4·67	4·91	3·13	4·89	4·53	6·34
Percentage Composition of the Milk. Solids other than Fat	9·23	8·67	9·43	9·29	9·77	8·71	9·27	9·00
Percentage Composition of the Milk. Solids	12·90	13·20	14·10	14·20	12·90	13·60	13·80	15·34
Actual weight of Fat, in lbs.	·91	1·00	·69	·67	·42	·63	·73	·98
Calculation of Points multiply by 20	18·2	20·0	13·8	13·4	8·4	12·6	14·6	19·6
Actual weight of Solids other than Fat, in lbs	2·30	1·93	1·38	1·26	1·33	1·13	1·50	1·4
Calculation of Points multiply by 4	9·20	7·72	5·52	5·04	5·32	4·52	6·0	5·6
Points: For time since Calving	—		11·2		—		6·1	
Points: For weight of Milk	47·2		28·3		26·5		31·7	
Points: For weight of Fat	38·2		27·2		21·0		34·2	
Points: For weight of Solids other than Fat	16·9		10·6		9·8		11·6	
Total	102·3		77·3		57·3		83·6	
Deductions	—		—		—		—	
Points gained	102·3		77·3		57·3		83·6	
Remarks and Awards	High Commendation.							

CLASS 6.—JERSEY COWS—*Continued.*

Number	97		98		99		100	
Name	Brown Fancy		Punctuality		Dewdrop		Primrose Planet	
Age	5 yr. 6 m. 3 w.		3 yr. 6 m. 1 w.		7 yr. 1 m.		5 yr. 2 m. 1 w.	
Number of Calves	—		—		—		4	
Last Calved	April 24.		Aug. 5.		July 29.		May 30.	
Days since Calving	165		62		69		129	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	10·8	10·0	14·5	13·0	20·0	17·4	16·5	18·5
Weight of Milk, 2nd day	10·2	8·8	15·2	14·1	18·7	17·9	17·9	17·2
Average	10·5	9·4	14·8	13·5	19·3	17·6	17·2	17·9
Percentage Composition of the Milk. Fat	7·93	7·36	6·20	6·59	3·61	4·36	6·02	7·73
Percentage Composition of the Milk. Solids other than Fat	9·95	9·78	10·06	9·91	9·11	8·96	9·52	9·11
Percentage Composition of the Milk. Solids	17·88	17·14	16·26	16·50	12·72	13·32	15·54	16·84
Actual weight of Fat, in lbs.	·83	·69	·92	·89	·70	·77	1·03	1·38
Calculation of Points multiply by 20	16·6	13·8	18·4	17·8	14·0	15·4	20·6	27·6
Actual weight of Solids other than Fat, in lbs.	1·04	·92	1·57	1·34	1·76	1·58	1·64	1·63
Calculation of Points multiply by 4	4·16	3·68	6·28	5·36	7·04	6·32	6·56	6·52
Points: For time since Calving	12·0		2·2		2·9		8·9	
Points: For weight of Milk	19·9		28·3		36·9		35·0	
Points: For weight of Fat	30·4		36·2		29·4		48·2	
Points: For weight of Solids other than Fat	7·8		11·6		13·4		13·1	
Total	70·1		78·3		82·6		105·2	
Deductions	—		—		—		—	
Points gained	70·1		78·3		82·6		105·2	
Remarks and Awards							High Commendation.	

CLASS 6.—JERSEY COWS—*Continued.*

Number	101		102		104		106	
Name	Lucy's Wonder		Olivette 3rd		Muscotah		Belfry	
Age	5 yr. 5 m. 3 w.		9 yr. 2 m.		6 yr. 4 m. 1 w.		4 yr. 4 m. 2 w.	
Number of Calves	4		7		4		2	
Last Calved	April 10.		April 29.		April 17.		Aug. 18.	
Days since Calving	179		160		172		49	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	13·8	11·5	12·5	14·9	13·1	12·4	22·1	21·3
Weight of Milk, 2nd day	14·5	12·8	11·4	14·5	12·2	11·2	21·9	20·7
Average	14·1	12·1	11·9	14·7	12·6	11·8	22·0	21·0
Percentage Composition of the Milk. Fat	5·76	6·04	3·15	5·96	7·04	9·06	3·23	4·58
Percentage Composition of the Milk. Solids other than Fat	9·74	9·80	9·35	8·74	10·00	9·60	9·23	8·98
Percentage Composition of the Milk. Solids	15·50	15·84	12·50	14·70	17·04	18·66	12·46	13·56
Actual weight of Fat, in lbs.	·81	·73	·37	·87	·89	1·07	·71	·96
Calculation of Points multiply by 20	16·2	14·6	7·4	17·4	17·8	21·4	14·2	19·2
Actual weight of Solids other than Fat, in lbs	1·37	1·19	1·11	1·28	1·26	1·13	2·02	1·89
Calculation of Points multiply by 4	5·48	4·76	4·44	5·12	5·04	4·52	8·08	7·56
Points: For time since Calving	12·0		12·0		12·0		·9	
Points: For weight of Milk	26·2		26·6		24·4		43·0	
Points: For weight of Fat	30·8		24·8		39·2		33·4	
Points: For weight of Solids other than Fat	10·2		9·6		9·6		15·6	
Total	79·2		73·0		85·2		92·9	
Deductions	—		—		—		—	
Points gained	79·2		73·0		85·2		92·9	
Remarks and Awards								

CLASS 6.—JERSEY COWS—*Continued.*

Number	107		108		110		113	
Name	Ghezireh		Mary		Warder's Queen		Loulah 3rd	
Age	4 yr. 4 m. 3 w.		7 yr. 7 m. 3 w.		5 yr. 11 m. 3 w.		4 yr. 11 m. 2 w.	
Number of Calves	—		—		4		3	
Last Calved	May 14.		April 19.		July 5.		Aug. 24.	
Days since Calving	145		170		93		43	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	22·0	19·3	20·8	18·3	9·8	9·0	14·3	14·3
Weight of Milk, 2nd day	17·0	18·0	20·2	18·6	9·9	8·3	16·2	14·0
Average	19·5	18·6	20·5	18·4	9·8	8·6	15·2	14·1
Percentage Composition of the Milk. Fat	4·93	5·21	5·29	5·82	7·87	7·87	4·81	4·74
Percentage Composition of the Milk. Solids other than Fat ..	9·43	9·33	9·05	8·92	9·31	8·57	9·27	8·76
Percentage Composition of the Milk. Solids	14·36	14·54	14·34	14·74	17·18	16·44	14·08	13·50
Actual weight of Fat, in lbs.	·96	·97	1·09	1·07	·77	·68	·73	·67
Calculation of Points multiply by 20 ..	19·2	19·4	21·8	21·4	15·4	13·6	14·6	13·4
Actual weight of Solids other than Fat, in lbs.	1·84	1·74	1·86	1·64	·91	·74	1·40	1·23
Calculation of Points multiply by 4 ..	7·36	6·96	7·44	6·56	3·64	2·96	5·60	4·92
Points: For time since Calving	10·5		12·0		5·3		·3	
Points: For weight of Milk	38·1		38·9		18·4		29·3	
Points: For weight of Fat..	38·6		43·2		29·0		28·0	
Points: For weight of Solids other than Fat	14·3		14·0		6·6		10·5	
Total	101·5		108·1		59·3		68·1	
Deductions ..	—		—		—		—	
Points gained..	101·5		108·1		59·3		68·1	
Remarks and Awards	High Commendation.		Additional 3rd Prize Given.					

Class 6.—JERSEY COWS—*Continued*

	114		115		116	
Name	Marigold		Post Obit		Marionette	
Age	8 yr. 3 m. 3 w.		5 yr. 6 m. 1 w.		5 yr.	
Number of Calves	—		—		—	
Last Calved	July 30		May 27		July 23	
Days since Calving	68		132		75	
	Morn.	Even.	Morn	Even.	Morn.	Even.
Weight of Milk, 1st day	26·5	23·3	22·0	20·9	23·0	22·3
Weight of Milk, 2nd day	25·5	22·0	23·6	21·9	24·6	22·9
Average	26·0	22·6	22·8	21·4	23·8	22·6
Percentage Composition of the Milk. — Fat	5·87	6·35	4·41	5·33	3·76	4·61
Percentage Composition of the Milk. — Solids other than Fat	9·49	9·35	9·19	8·87	9·20	9·03
Percentage Composition of the Milk. — Solids	15·36	15·70	13·60	14·20	12·96	13·64
Actual weight of Fat, in lbs.	1·53	1·44	1·00	1·14	·90	1·04
Calculation of Points multiply by 20	30·6	28·8	20·0	22·8	18·0	20·8
Actual weight of Solids other than Fat, in lbs	2·48	2·12	2·10	1·90	2·20	2·03
Calculation of Points multiply by 4	9·92	8·48	8·40	7·60	8·80	8·12
Points — For time since Calving	2·8		9·2		3·5	
Points — For weight of Milk	48·6		44·2		46·4	
Points — For weight of Fat	59·4		42·8		38·8	
Points — For weight of Solids other than Fat	18·4		16·0		16·9	
Total	129·2		112·2		105·6	
Deductions	—		—		—	
Points gained	129·2		112·2		105 6	
Remarks and Awards	1st Prize		2nd Prize.		High Commendation.	

Class 9.—GUERNSEY COWS.

Number	153		154		156		157	
Name	Lady No. 88		Wickham Buttercup 2nd		Rose of the Spurs 4th		Golden Cherry	
Age	7 yr. 5 m. 1 w.		6 yr. 9 m. 3 w.		11 yr. 7 m. 3 w.		12 yr. 0 m. 3 w.	
Number of Calves	—		—		—		—	
Last Calved	July 12.		June 23.		Aug. 20.		Aug. 18.	
Days since Calving	86		105		47		49	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	18·5	13·5	17·4	15·0	19·5	16·1	12·3	11·5
Weight of Milk, 2nd day	16·8	13·7	17·8	13·3	20·4	17·8	14·2	11·3
Average	17·6	13·6	17·6	14·1	19·9	16·9	13·2	11·4
Percentage Composition of the Milk. — Fat	6·13	5·60	5·15	5·61	4·30	4·85	3·83	4·07
Percentage Composition of the Milk. — Solids other than Fat	9·21	8·96	9·55	9·51	9·38	9·03	8·87	8·71
Percentage Composition of the Milk. — Solids	15·34	14·56	14·70	15·12	13·68	13·88	12·70	12·78
Actual weight of Fat, in lbs.	1·08	·76	·90	·79	·86	·82	·51	·46
Calculation of Points multiply by 20	21·6	15·2	18·0	15·8	17·2	16·4	10·2	9·2
Actual weight of Solids other than Fat, in lbs	1·62	1·22	1·68	1·34	1·87	1·53	1·17	1·00
Calculation of Points multiply by 4	6·48	4·88	6·72	5·36	7·48	6·12	4·68	4·00
Points — For time since Calving	4·6		6·5		·7		·9	
Points — For weight of Milk	31·2		31·7		36·8		24·6	
Points — For weight of Fat	36·8		33·8		33·6		19·4	
Points — For weight of Solids other than Fat	11·4		12·1		13·6		8·7	
Total	84·0		84·1		84·7		53·6	
Deductions	—		—		—		—	
Points gained	84·0		84·1		84·7		53·6	
Remarks and Awards								

Class 9.—GUERNSEY COWS—*Continued.*

Number	158		159	
Name	Fi Fi		Hayes Express	
Age	11 yr. 5 m.		6 yr. 1 m.	
Number of Calves			—	
Last Calved	July 31.		June 8.	
Days since Calving	67		120	
	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	12·5	11·2	13·6	13·0
Weight of Milk, 2nd day	14·5	11·5	15·4	12·4
Average	13·5	11·3	14·5	12·7
Percentage Composition of the Milk. Fat	4·68	5·30	4·75	5·05
Percentage Composition of the Milk. Solids other than Fat	9·50	9·10	9·89	9·35
Percentage Composition of the Milk. Solids	14·18	14·40	14·64	14·40
Actual weight of Fat, in lbs.	·63	·60	·69	·64
Calculation of Points multiply by 20	12·6	12·0	13·8	12·8
Actual weight of Solids other than Fat, in lbs	1·28	1·03	1·44	1·19
Calculation of Points multiply by 4	5·12	4·12	5·76	4·76
Points: For time since Calving	2·7		8·0	
Points: For weight of Milk	24·8		27·2	
Points: For weight of Fat	24·6		26·6	
Points: For weight of Solids other than Fat	9·2		10·5	
Total	61·3		72·3	
Deductions	—		—	
Points gained	61·3		72·3	
Remarks and Awards				

CLASS 11.—RED POLLED COWS.

Number	162		163		164		165	
Name	Mona		Rendlesham Abigail		Rendlesham Fay		Bounty	
Age	7 yr. 8 m. 2 w.		9 yr.		7 yr. 5 m.		5 yr. 6 m.	
Number of Calves	4		6		5		—	
Last Calved	Sept. 16.		Aug. 8		April 24.		June 27.	
Days since Calving	20		59		165		101	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	27·6	26·6	20·0	25·7	18·6	16·7	16·2	15·2
Weight of Milk, 2nd day	28·3	25·7	24·0	22·5	20·6	18·0	15·7	17·1
Average	27·9	26·1	22·0	24·1	19·6	17·3	15·9	16·1
Percentage Composition of the Milk. Fat	3·03	3·46	1·64	4·04	2·91	3·32	4·17	5·23
Percentage Composition of the Milk. Solids other than Fat	9·17	9·18	8·92	8·62	8·89	9·02	9·53	9·41
Percentage Composition of the Milk. Solids	12·20	12·64	10·56	12·66	11·80	12·34	13·70	14·64
Actual weight of Fat, in lbs.	·85	·90	·36	·97	·57	·57	·66	·84
Calculation of Points multiply by 20	17·0	18·0	7·2	19·4	11·4	11·4	13·2	16·8
Actual weight of Solids other than Fat, in lbs.	2·54	2·40	1·95	2·08	1·74	1·56	1·52	1·52
Calculation of Points multiply by 4	10·16	9·60	7·80	8·32	6·96	6·24	6·08	6·08
Points: For time since Calving	—		1·9		12·0		6·1	
Points: For weight of Milk	54·0		46·1		36·9		32·0	
Points: For weight of Fat	35·0		26·6		22·8		30·0	
Points: For weight of Solids other than Fat	19·8		16·1		13·2		12·2	
Total	108·8		90·7		84·9		80·3	
Deductions	—		10·0		10·0		—	
Points gained	108·8		80·7		74·9		80·3	
Remarks and Awards	1st Prize.							

CLASS 11.—RED POLLED COWS—*Continued.*

Number	166		167		168		169	
Name	Sudbourne Abigail 2nd		Sudbourne Belle Dotty 1st		Sudbourne Abigail		Sudbourne Queen 1st	
Age	3 yr. 1 m. 2 w.		5 yr. 0 m. 1 w.		7 yr.		5 yr.	
Number of Calves	2		3		5		3	
Last Calved	Aug. 7.		Aug. 19		July 4.		June 1	
Days since Calving	60		48		94		127	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	18·2	18·0	20·2	20·0	19·9	17·9	21·9	18·9
Weight of Milk, 2nd day	20·5	17·4	21·3	17·2	19·5	15·9	24·3	20·9
Average	19·3	17·7	20·7	18·6	19·7	16·9	23·1	19·9
Percentage Composition of the Milk. Fat	3·56	3·68	3·61	3·46	3·96	4·01	4·00	3·61
Percentage Composition of the Milk. Solids other than Fat	8·98	8·82	8·99	8·78	9·56	9·39	9·32	9·29
Percentage Composition of the Milk. Solids	12·54	12·50	12·60	12·24	13·52	13·40	13·32	12·90
Actual weight of Fat, in lbs.	·69	·65	·75	·64	·78	·68	·92	·72
Calculation of Points multiply by 20	13·8	13·0	15·0	12·8	15·6	13·6	18·4	14·4
Actual weight of Solids other than Fat, in lbs	1·74	1·56	1·86	1·63	1·88	1·58	2·15	1·85
Calculation of Points multiply by 4	6·96	6·24	7·44	6·52	7·52	6·32	8·60	7·40
Points: For time since Calving	2·0		·8		5·4		8·7	
Points: For weight of Milk	37·0		39·3		36·6		43·0	
Points: For weight of Fat	26·8		27·8		29·2		32·8	
Points: For weight of Solids other than Fat	13·2		14·0		13·8		16·0	
Total	79·0		81·9		85·0		100·5	
Deductions	—		—		—		—	
Points gained	79·0		81·9		85·0		100·5	
Remarks and Awards					Reserve.		2nd Prize.	

CLASS 12.—RED POLLED HEIFERS (NOT EXCEEDING THREE YEARS).

	171		173		175		176	
Name	Rendlesham Favour		Rendlesham Rosalie		Ashmoor Molly		Ashmoor Jewess	
Age	2 yr. 5 m. 3 w.		2 yr. 4 m.		2 yr. 5 m.		2 yr. 5 m. 1 w.	
Number of Calves	—		—		—		—	
Last Calved	Aug. 29.		Aug. 19.		Aug. 10.		Sept. 7.	
Days since Calving	38		48		57		29	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	11·4	11·5	13·9	12·6	15·0	13·8	16·8	15·4
Weight of Milk, 2nd day	12·0	11·4	12·7	12·2	15·8	15·8	17·0	14·4
Average	11·7	11·4	13·3	12·4	15·4	14·8	16·9	14·9
Percentage Composition of the Milk. Fat	3·40	4·30	3·65	3·36	5·70	4·51	3·52	3·41
Percentage Composition of the Milk. Solids other than Fat	8·94	8·60	8·99	9·24	9·70	9·49	9·52	9·29
Percentage Composition of the Milk. Solids	12·34	12·90	12·64	12·60	15·40	14·00	13·04	12·70
Actual weight of Fat, in lbs.	·40	·49	·48	·42	·88	·67	·60	·51
Calculation of Points multiply by 20	8·0	9·8	9·6	8·4	17·6	13·4	12·0	10·2
Actual weight of Solids other than Fat, in lbs.	1·05	·98	1·20	1·15	1·50	1·40	1·61	1·39
Calculation of Points multiply by 4	4·20	3·92	4·80	4·60	6·00	5·60	6·44	5·56
Points: For time since Calving	—		·8		1·7		—	
Points: For weight of Milk	23·1		25·7		30·2		31·8	
Points: For weight of Fat	17·8		18·0		31·0		22·2	
Points: For weight of Solids other than Fat	8·1		9·4		11·6		12·0	
Total	49·0		53·9		74·5		66·0	
Deductions	—		—		—		—	
Points gained	49·0		53·9		74·5		66·0	
Remarks and Awards					1st Prize.		3rd Prize.	

CLASS 12.—RED POLLED HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

Number	177		178		179	
Name	Sudbourne Molly		Sudbourne Molly Bett 2nd		Sudbourne Rosie	
Age	2 yr. 8 m. 3 w.		2 yr. 1 m.		2 yr. 4 m.	
Number of Calves	1		—		1	
Last Calved	May 8.		Aug. 1.		July. 14	
Days since Calving	151		66		84	
	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	12·4	12·3	13·0	11·8	11·7	9·8
Weight of Milk, 2nd day	15·1	11·9	12·7	12·5	11·9	10·6
Average	13·7	12·1	12·8	12·1	11·8	10·2
Percentage Composition of the Milk. Fat	4·07	3·50	4·56	4·20	3·35	3·80
Percentage Composition of the Milk. Solids other than Fat	9·63	9·44	9·48	9·60	9·73	9·50
Percentage Composition of the Milk. Solids	13·70	12·94	14·04	13·80	13·08	13·30
Actual weight of Fat, in lbs.	·56	·42	·59	·51	·40	·39
Calculation of Points multiply by 20	11·2	8·4	11·8	10·2	8·0	7·8
Actual weight of Solids other than Fat, in lbs	1·32	1·14	1·21	1·16	1·15	·97
Calculation of Points multiply by 4	5·28	4·56	4·84	4·64	4·60	3·88
Points: For time since Calving	11·1		2·6		4·4	
Points: For weight of Milk	25·8		24·9		22·0	
Points: For weight of Fat	19·6		22·0		15·8	
Points: For weight of Solids other than Fat	9·8		9·5		8·5	
Total	66·3		59·0		50·7	
Deductions	—		—		—	
Points gained	66·3		59·0		50·7	
Remarks and Awards	2nd Prize.		Reserve.			

Class 14.—SOUTH DEVON COWS.

Number	182		183		184		185	
Name	Peeper 2nd		Fancy		Fancy 4th		Ernestine	
Age	5 yr. 9 m.		12 yr. 2 m. 2 w.		10 yr. 8 m. 3 w.		4 yr. 5 m. 1 w.	
Number of Calves	4		9		—		—	
Last Calved	July 8.		Aug. 26.		May 6.		July 18.	
Days since Calving	90		41		153		80	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	8·5	15·1	27·9	26·1	22·3	19·5	12·9	14·1
Weight of Milk, 2nd day	14·7	13·2	28·4	25·7	22·1	19·5	14·7	13·1
Average	11·6	14·1	28·1	25·9	22·2	19·5	13·8	13·6
Percentage Composition of the Milk. — Fat	4·31	4·55	4·09	4·69	3·56	4·00	3·94	4·94
Percentage Composition of the Milk. — Solids other than Fat	8·85	8·69	9·13	8·97	9·02	8·80	9·38	9·00
Percentage Composition of the Milk. — Solids	13·16	13·24	13·22	13·66	12·58	12·80	13·32	13·94
Actual weight of Fat, in lbs.	·50	·64	1·15	1·22	·79	·78	·54	·67
Calculation of Points multiply by 20	10·0	12·8	23·0	24·4	15·8	15·6	10·8	13·4
Actual weight of Solids other than Fat, in lbs	1·03	1·23	2·54	2·31	2·00	1·72	1·28	1·22
Calculation of Points multiply by 4	4·12	4·92	10·16	9·24	8·00	6·88	5·12	4·88
Points — For time since Calving	5·0		·1		11·3		4·0	
Points — For weight of Milk	25·7		54·0		41·7		27·4	
Points — For weight of Fat	22·8		47·4		31·4		24·2	
Points — For weight of Solids other than Fat	9·0		19·4		14·9		10·0	
Total	62·5		120·9		99·3		65·6	
Deductions	—		—		—		—	
Points gained	62·5		120·9		99·3		65·6	
Remarks and Awards			1st Prize, Spencer Challenge Cup.		Reserve.			

CLASS 14.—SOUTH DEVON COWS—*Continued.*

Number	186	
Name	Ladybird 3rd	
Age	10 yr. 10 m.	
Number of Calves	—	
Last Calved	May 21.	
Days since Calving	138	
	Morn.	Even.
Weight of Milk, 1st day	26·2	26·0
Weight of Milk, 2nd day	26·1	26·1
Average	26·1	26·0
Percentage Composition of the Milk. — Fat	3·13	4·40
Percentage Composition of the Milk. — Solids other than Fat	9·47	9·20
Percentage Composition of the Milk. — Solids	12·60	13·60
Actual weight of Fat, in lbs.	·82	1·14
Calculation of Points multiply by 20	16·4	22·8
Actual weight of Solids other than Fat, in lbs	2·46	2·40
Calculation of Points multiply by 4	9·84	9·60
Points — For time since Calving	9·8	
Points — For weight of Milk	52·1	
Points — For weight of Fat	39·2	
Points — For weight of Solids other than Fat	19·4	
Total	120·5	
Deductions	—	
Points gained	120·5	
Remarks and Awards	2nd Prize.	

Class 15.—KERRY COWS.

Number	187		188	
Name	Buckhurst Peaceful		Waterville Saffhire	
Age	10 yr. 3 m. 1 w.		10 yr.	
Number of Calves	7		6	
Last Calved	Aug. 30.		June 15.	
Days since Calving	37		113	
	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	15·2	14·4	13·6	14·1
Weight of Milk, 2nd day	15·8	13·5	15·8	15·3
Average	15·5	13·9	14·7	14·7
Percentage Composition of the Milk. — Fat	3·57	4·42	4·30	5·87
Percentage Composition of the Milk. — Solids other than Fat	9·03	8·64	9·50	8·93
Percentage Composition of the Milk. — Solids	12·60	13·06	13·80	14·80
Actual weight of Fat, in lbs.	·55	·61	·63	·86
Calculation of Points multiply by 20	11·0	12·2	12·6	17·2
Actual weight of Solids other than Fat, in lbs	1·40	1·20	1·40	1·32
Calculation of Points multiply by 4	5·60	4·80	5·60	5·28
Points — For time since Calving	—		7·3	
Points — For weight of Milk	29·4		29·4	
Points — For weight of Fat	23·2		29·8	
Points — For weight of Solids other than Fat	10·4		10·9	
Total	63·0		77·4	
Deductions	—		—	
Points gained	63·0		77·4	
Remarks and Awards	Reserve.		1st Prize.	

CLASS 22.—GOATS (ANY VARIETY).

Number	234		235		238		239	
Name	Mea Gem		Laxwood Flame		Leazes Eve		Killerton Opal	
Age	3 yr. 6 m. 3 w.		3 y. 5 m. 2 w.		2 y. 6 m.		3 yr. 6 m.	
Number of Kids	—		—		—		3	
Last Kidded	May 30.		May 5.		April 14.		April 14.	
Days since Kidding	129		154		175		175	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	1·9	1·7	2·0	2·0	3·9	3·6	3·3	3·0
Weight of Milk, 2nd day	1·5	1·4	1·8	1·8	3·8	3·0	3·0	2·4
Average	1·7	1·5	1·9	1·9	3·8	3·3	3·1	2·7
Percentage Composition of the Milk. — Fat	5·07	5·02	3·70	3·82	4·19	4·35	5·75	5·25
Percentage Composition of the Milk. — Solids other than Fat	9·33	9·04	8·52	8·52	9·15	8·61	9·19	9·06
Percentage Composition of the Milk. — Solids	14·40	14·06	12·22	12·34	13·34	12·96	14·94	14·30
Actual weight of Fat, in lbs.	·086	·075	·070	·072	·159	·143	·178	·141
Calculation of Points multiply by 20	1·72	1·50	1·40	1·44	3·18	2·86	3·56	2·82
Actual weight of Solids other than Fat, in lbs	·159	·136	·162	·162	·348	·284	·286	·244
Calculation of Points multiply by 4	·636	·544	·648	·648	1·392	1·136	1·144	·976
Points — For time since Kidding	2·1		2·5		2·9		2·9	
Points — For weight of Milk	3·2		3·8		7·1		5·8	
Points — For weight of Fat	3·2		2·8		6·0		6·4	
Points — For weight of Solids other than Fat	1·2		1·3		2·5		2·1	
Total	9·7		10·4		18·5		17·2	
Deductions	—		2·0		—		—	
Points gained	9·7		8·4		18·5		17·2	
Remarks and Awards					1st Prize Baroness B. Coutts' Challenge Cup.		2nd Prize.	

CLASS 22.—GOATS (ANY VARIETY)—*Continued.*

Number	240		241		242		243	
Name	Leazes Lilac		Rousette		Folette		Sedgemere Cravate	
Age	3 yr. 5 m. 3 w.		3 yr. 6 m.		8 yr. 7 m.		3 yr. 5 m. 3 w.	
Number of Kids	3		—		—		—	
Last Kidded	Aug. 22.		Feb. 14.		March 1.		April 28.	
Days since Kidding	45		234		219		161	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	2·4	2·1	1·8	1·6	2·4	1·9	3·5	3·1
Weight of Milk, 2nd day	2·2	2·0	1·4	1·3	2·0	1·4	3·6	3·3
Average	2·3	2·0	1·6	1·4	2·2	1·6	3·5	3·2
Percentage Composition of the Milk. — Fat	4·60	4·76	3·64	3·72	3·21	3·24	3·14	3·77
Percentage Composition of the Milk. — Solids other than Fat	9·48	9·24	8·76	8·98	8·95	9·16	8·66	8·47
Percentage Composition of the Milk. — Solids	14·08	14·00	12·40	12·70	12·16	12·40	11·80	12·24
Actual weight of Fat, in lbs.	·106	·095	·058	·052	·07	·052	·110	·120
Calculation of Points multiply by 20	2·12	1·90	1·16	1·04	1·4	1·04	2·20	2·40
Actual weight of Solids other than Fat, in lbs	·218	·185	·140	·125	·197	·147	·320	·270
Calculation of Points multiply by 4	·872	·740	·56	·500	·788	·588	1·280	1·08
Points — For time since Kidding	—		3·9		3·6		2·6	
Points — For weight of Milk	4·3		3·0		3·8		6·7	
Points — For weight of Fat	4·0		2·2		2·4		4·6	
Points — For weight of Solids other than Fat	1·6		1·1		1·4		2·4	
Total	9·9		10·2		11·2		16·3	
Deductions	—		—		2·0		2·0	
Points gained	9·9		10·2		9·2		14·3	
Remarks and Awards							Commendation.	

CLASS 22.—GOATS (ANY VARIETY)—*Continued.*

Number	244		246		249		250	
Name	Copthorne Tangorine		Sedgemere Cassandra		Smilax		Bricket Belladonna	
Age	3 yr. 8 m. 1 w.		3 yr. 6 m. 3 w.		4 yr. 8 m.		3 yr. 7 m.	
Number of Kids	—		4		2		—	
Last Kidded	Aug. 4.		March 2.		March 2.		April 7.	
Days since Kidding	63		218		218		182	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	4·3	3·6	2·6	2·3	·9	·8	1·4	1·3
Weight of Milk, 2nd day	4·1	3·6	2·4	2·2	·7	·6	1·2	1·3
Average	4·2	3·6	2·5	2·2	·8	·7	1·3	1·3
Percentage Composition of the Milk. Fat	3·61	4·25	2·74	2·88	4·14	4·41	6·57	7·90
Percentage Composition of the Milk. Solids other than Fat	8·51	8·29	8·58	8·56	8·86	8·59	10·37	10·10
Percentage Composition of the Milk. Solids	12·12	12·54	11·32	11·44	13·00	13·00	16·94	18·00
Actual weight of Fat, in lbs.	·152	·153	·069	·063	·033	·031	·085	·103
Calculation of Points multiply by 20	3·04	3·06	1·38	1·26	·66	·62	1·70	2·06
Actual weight of Solids other than Fat, in lbs	·357	·300	·213	·188	·071	·060	·135	·131
Calculation of Points multiply by 4	1·428	1·2	·852	·752	·284	·240	·540	·524
Points: For time since Kidding	1·0		3·6		3·6		3·0	
Points: For weight of Milk	7·8		4·7		1·5		2·6	
Points: For weight of Fat	6·1		2·6		1·3		3·8	
Points: For weight of Solids other than Fat	2·6		1·6		·5		1·1	
Total	17·5		12·5		6·9		10·5	
Deductions	1·0		2·0		—		—	
Points gained	16·5		10·5		6·9		10·5	
Remarks and Awards	Very High Commendation.							

Class 22.—GOATS (ANY VARIETY)—*Continued.*

Number	252		254		256		261	
Name	Easton Royal		Sparkie		Princess Gertie		Blossom	
Age	4 yr. 10 m.		6 yr.		2 yr. 6 m.		7 yr. 4 m.	
Number of Kids	—		—		—		12	
Last Kidded	April 18.		April 12.		July 18.		Aug. 30.	
Days since Kidding	171		177		80		37	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	2·4	1·9	2·0	1·9	1·5	1·4	4·0	3·3
Weight of Milk, 2nd day	2·0	2·2	1·7	1·6	1·5	1·6	4·0	2·4
Average	2·2	2·0	1·8	1·7	1·5	1·5	4·0	2·8
Percentage Composition of the Milk. — Fat	4·64	4·91	4·35	5·04	5·15	5·19	4·32	5·04
Percentage Composition of the Milk. — Solids other than Fat	9·70	9·57	8·65	8·42	8·55	8·45	9·18	9·70
Percentage Composition of the Milk. — Solids	14·34	14·48	13·00	13·46	13·70	13·64	13·50	14·74
Actual weight of Fat, in lbs.	·102	·098	·078	·086	·077	·078	·172	·141
Calculation of Points multiply by 20	2·04	1·96	1·56	1·72	1·54	1·56	3·44	2·82
Actual weight of Solids other than Fat, in lbs.	·214	·192	·156	·143	·128	·127	·366	·272
Calculation of Points multiply by 4	·856	·768	·624	·572	·512	·508	1·464	1·088
Points — For time since Kidding	2·8		2·9		1·3		—	
Points — For weight of Milk	4·2		3·5		3·6		6·8	
Points — For weight of Fat	4·0		3·3		3·1		6·3	
Points — For weight of Solids other than Fat	1·6		1·2		1·0		2·5	
Total	12·6		10·9		8·4		15·6	
Deductions	—		—		—		—	
Points gained	12·6		10·9		8·4		15·6	
Remarks and Awards							High Commendation.	

CLASS 22.—GOATS (ANY VARIETY)—*Continued.*

Number	262		263		267		268	
Name	Copthorne Pollen		Copthorne Orange		Nannie		Crab	
Age	2 yr. 7 m. 2 w.		2 yr. 6 m. 2 w.		8 y.		4 yr. 5 m.	
Number of Kids	—		—		8		6	
Last Kidded	Aug. 18.		March 9.		March 14.		Sept. 3.	
Days since Kidding	49		211		206		33	
	Morn.	Even.	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	3·6	3·2	3·1	2·4	2·2	2·3	3·8	3·2
Weight of Milk, 2nd day	2·9	2·9	2·9	2·6	1·9	1·6	3·8	3·5
Average	3·2	3·0	3·0	2·5	2·0	1·9	3·8	3·3
Percentage Composition of the Milk. Fat	5·46	6·90	2·80	2·75	5·79	6·75	5·07	5·27
Percentage Composition of the Milk. Solids other than Fat	9·66	9·60	8·34	8·49	9·47	8·99	9·53	8·99
Percentage Composition of the Milk. Solids	15·12	16·50	11·14	11·24	15·26	15·74	14·60	14·26
Actual weight of Fat, in lbs.	·175	·207	·084	·069	·160	·128	·193	·174
Calculation of Points multiply by 20	3·50	4·14	1·68	1·38	3·20	2·56	3·86	3·48
Actual weight of Solids other than Fat, in lbs	·31	·288	·250	·213	·189	·170	·361	·295
Calculation of Points multiply by 4	1·24	1·152	1·00	·852	·756	·680	1·444	1·180
Points: For time since Kidding	—		3·5		3·4		—	
Points: For weight of Milk	6·2		5·5		3·9		7·1	
Points: For weight of Fat	7·6		3·1		5·8		7·3	
Points: For weight of Solids other than Fat	2·4		1·8		1·4		2·6	
Total	16·2		13·9		14·5		17·0	
Deductions	—		2·0		—		—	
Points gained	16·2		11·9		14·5		17·0	
Remarks and Awards	Very High Commendation Reserve Challenge Cup				Commendation.		3rd Prize.	

CLASS 22.—GOATS (ANY VARIETY)—*Continued.*

	269		273		276	
Number / Name	Recluse		Zulicka 2nd		Broxbourne Venus	
Age	2 yr. 6 m. 3 w.		3 yr. 2 m. 2 w.		4 yr. 7 m.	
Number of Kids	5		4		—	
Last Kidded	Aug. 18.		April 27.		March 1.	
Days since Kidding	49		162		219	
	Morn.	Even.	Morn.	Even.	Morn.	Even.
Weight of Milk, 1st day	4·0	3·5	1·4	1·2	2·4	2·2
Weight of Milk, 2nd day	3·7	3·3	1·3	1·2	2·2	2·0
Average	3·8	3·4	1·3	1·2	2·3	2·1
Percentage Composition of the Milk. Fat	4·45	4·87	4·06	4·41	5·40	5·49
Percentage Composition of the Milk. Solids other than Fat	9·71	9·67	10·24	9·79	8·82	8·71
Percentage Composition of the Milk. Solids	14·16	14·54	14·30	14·20	14·22	14·20
Actual weight of Fat, in lbs.	·169	·166	·053	·053	·124	·115
Calculation of Points multiply by 20	3·38	3·32	1·06	1·06	2·48	2·30
Actual weight of Solids other than Fat, in lbs	·370	·330	·133	·117	·203	·183
Calculation of Points multiply by 4	1·480	1·320	·532	·468	·812	·732
Points: For time since Kidding	—		2·7		3·6	
Points: For weight of Milk	7·2		2·5		4·4	
Points: For weight of Fat	6·7		2·1		4·8	
Points: For weight of Solids other than Fat	2·8		1·0		1·5	
Total	16·7		8·3		14·3	
Deductions	—		—		—	
Points gained	16·7		8·3		14·3	
Remarks and Awards	Reserve.				Commendation.	

THE BUTTER TESTS FOR 1909.

By R. H. Evans, B.Sc.

Only 61 cows out of 76 entered, competed for the various prizes offered in the Butter Test Classes at the 1909 Dairy Show.

Of the milking breeds of cattle, Ayrshires, Dutch, and Welsh were not represented.

South Devons put in an appearance for the first time since 1906. It is to be hoped that the success of the representatives of this breed at the 1909 Show will prove an incentive to Devon breeders to get together a strong class of the milking strain of Devon cattle at subsequent Shows.

The conditions obtaining in the Agricultural Hall this year proved much more favourable for the successful production of butter than was the case at the 1908 Show.

The cattle were judged according to the same scale of points as in previous years.

For the purpose of comparison from year to year, the following figures will prove of some interest.

The average number of points for the 61 cows tested works out at 33·3. The total milk yield by the same in 24 hours amounted to approximately 2561 lbs., or practically 256 gallons. This shows an average per cow per diem of 42 lbs.,—over 4 gallons.

The average butter ratio (*i.e.*, the number of lbs. of milk necessary for the production of 1 lb. of butter), is 1 : 23·51.

The total amount of butter churned amounted to 109 lbs. 10¼ ozs., an average of approximately 1 lb. 12¾ ozs. per cow.

The total amount of Fat, as obtained by chemical analyses, (excluding cows Nos. 53, 118, and 132), is 104·18 lbs. The total amount of butter (excluding that of the same three cows) being 105·24 lbs.

Of the various breeds, 19 Shorthorns yielded 970 lbs. of milk. This represents an average yield of approximately five gallons per cow per day. The average period of lactation was 54 days—two weeks in excess of the period when the flow of milk, as a rule, shows signs of diminishing (40 days).

The cream from the Shorthorns at the 1909 Show, proved to be much more churnable than it was at last year's Show. There was only one instance of cream taking more than 50 minutes in which to churn. The average for the 19 cows worked out at 33 minutes.

The colour of the butter of this breed was on the whole good. There were, however, several pale samples—the inevitable result of high feeding and forcing for milk production.

The quality was also good in most cases. There was less than usual of the soft, oily butter, which is so often met with in

butter test competitions.—The 19 Shorthorns yielded 35 lbs. 9¾ ozs. of butter—an average of 1 lb. 14 ozs. per cow.

Mr. S. Sanday's "Raspberry," and Mr. G. B. Nelson's "Buttercup," both yielded 2 lbs. 12¼ ozs.—the total number of points obtained in each case being 44·25—a very creditable performance. Mr. G. B. Nelson's "Red Rose 3rd," and Mr. L. B. Shirley's "Maimie," obtained respectively 40·15 and 40·00 points, while Mr. Tom Hunter's "Cherry Star" scored 39·5 points. The class averaged 32·31 points—a number slightly above the standard for the breed.

The Lincolnshire Red Shorthorns—eight in number—proved a good class of butter yielders. The total milk yield in 24 hours amounted to 382 lbs.—an average of 48 lbs. per cow, or approximately 4¾ gallons. The class averaged 1 lb. 14¾ ozs. of butter per day. Both the colour and quality of the butter were satisfactory. In this class, Mr. John Evens' "Burton Nancy 5th" yielded 3 lbs. 2 ozs. of butter, thus obtaining 50 points—a most excellent performance. Mr. Evens' "Burton Spotted 5th," and Mr. Fred Scorer's "Bracebridge Fullerby," obtained 35·75 and 35·00 points respectively. In this class the average number of points works out at 32·09.

Of Jerseys, 22 cows were put to the test. The total milk yield amounted to 746·25 lbs.—approximately 34 lbs. per cow per day. The butter was excellent both in colour and quality, and averaged 1 lb. 13½ ozs. per cow. The average points obtained in this class amounted to 37·12—well above the standard for the breed.

As a full account of the cattle competing in this class will appear in the English Jersey Cattle Society's Report for 1909, it is not necessary here to add any further details.

Four South Devons were tested, and gave a very satisfactory account of themselves. The yield of milk amounted to 171·62 lbs., averaging 42·90 lbs. per cow per day. The average butter yield was 1 lb. 13¾ ozs. This was of very good colour and texture. The class averaged 33·66 points—a very creditable performance. Mr. Vosper's "Lady Bird 3rd" obtained 39·05 points. Mr. Whitley's "Fancy," and Mr. Vosper's "Fancy 4th," also did well, obtaining respectively 37·85 and 35·00 points.

Of the other cows tested, the Guernseys (two in number), the Kerries (two), and the Red Polls (four), did not do quite as well as usual—not one of the cows representing these breeds obtaining the requisite number of points qualifying for a prize.

More detailed accounts of the performance of each cow will be found in the following tables.

In conclusion, I wish to acknowledge the able and willing assistance rendered by my colleagues, Messrs. Hammond and Craufurd (representing the English Jersey Cattle Society), and to tender my best thanks to all those who assisted in the carrying out of the 1909 Butter Tests.

BUTTER TEST—JERSEYS.

No. in Catalogue	Exhibitor and Name of Cow	Date of Birth	Date of last Calf	No. of Days in milk	Milk yield in 24 hrs.		Butter Yield		Ratio, viz., lbs. milk to lb. butter	Colour and Quality of Butter.		No. of Points for butter	No. of Points for period of Lactation	Total number of Points	Awards
			1909		lbs	ozs	lbs	ozs		Colour	Quality				
87	A. Miller-Hallett's Vanilla 2nd....	April 15, 1900	June 17	111	35	12	1	5	27·23	Very Good		21·00	7·10	28·10	
89	H. P. Smith's Primate's Pearl......	Oct. 14, 1904	May 27	132	33	8	2	0$\frac{1}{4}$	16·62	Pale	V. Good	32·25	9·20	41·45	Certificate of Merit
90	R. Bruce Ward's Mrs. Viola.......	Aug. 1, 1900	June 15	113	41	2	1	14$\frac{1}{2}$	21·57	V. Good	Ex.	30·50	7·30	37·80	Certificate of Merit
91	R. Bruce Ward's Lovely Venus....	Sept. 24, 1902	May 1	158	44	14	1	15	23·16	Very Good		31·00	11·80	42·80	Certificate of Merit
94	Lord Ludlow's Dairymaid	June 15, 1901	May 7	152	27	10	1	6	20·09	Pale	Ex.	22·00	11·20	33·20	
96	J. M. F. Fuller's Ripple 4th.......	Aug. 26, 1903	June 27	101	32	6	1	12$\frac{1}{4}$	18·33	V. Good	Ex.	28·25	6·10	34·35	
97	J. M. F. Fuller's Brown Fancy....	Feb. 10, 1904	April 24	165	20	12	1	10$\frac{3}{4}$	12·41	Good	Ex.	26·75	12·00	38·75	Certificate of Merit
98	J. M. F. Fuller's Punctuality	Feb. 28, 1906	Aug. 5	62	27	8	1	13$\frac{1}{4}$	15·04	V. Good	Ex.	29·25	2·20	31·45	Certificate of Merit
100	D. Mutton's Primrose Planet	June 22, 1904	May 30	129	35	0	2	7$\frac{1}{4}$	14·26	Very Good		39·25	8·90	48·15	3rd Prize, Bronze Medal and £3.
101	D. Mutton's Lucy's Wonder	Mar. 9, 1904	April 10	179	25	4	1	6$\frac{3}{4}$	17·75	V. Good	Good	22·75	12·00	34·75	
102	Ladies E. & D. Hope's Olivette 3rd..	1900	April 29	160	27	6	1	4$\frac{1}{2}$	21·36	Very Good		20·50	12·00	32·50	
104	Jersey de Knoop's Muscotah	Mar. 1, 1904	April 17	172	25	8	2	1$\frac{1}{4}$	12·27	Excellent		33·25	12·00	45·25	Certificate of Merit and £1 Butter Prize.
106	W. M. Cazalet's Belfry	May 12, 1905	Aug. 18	49	43	6	1	12$\frac{1}{4}$	24·56	Good		28·25	·90	29·15	

BUTTER TEST—JERSEYS—*Continued.*

No. in Catalogue	Exhibitor and Name of Cow	Date of Birth	Date of last Calf	No. of Days in Milk	Milk yield in 24 hrs.		Butter Yield		Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter		No. of Points for Butter	No. of Points for period of Lactation	Total number of Points	Awards
										Colour	Quality				
			1909		lbs	ozs	lbs	ozs							
107	Lady de Rothschild's Ghezireh....	April 9, 1905	May 14	145	41	4	2	3¼	18·72	Good	V. Good	35·25	10·50	45·75	Certificate of Merit
108	Lady de Rothschild's Mary	Jan. 5, 1902	April 19	170	39	0	2	4¾	16·97	Good	V. Good	36·75	12·00	48·75	2nd Prize, Silver Medal and £5.
110	Duke of Connaught's Warder's Queen	Sept. 10, 1903	July 5	93	18	12	1	9	12·00	Very Good		25·00	5·30	30·30	
113	O. F. Mosley's Loulah 3rd	Oct. 17, 1904	Aug. 24	43	28	8	1	7¼	19·61	V. Good	Ex.	23·25	·30	23·55	
114	J. H. Smith-Barry's Marigold	June 7, 1901	July 30	68	49	12	3	3	15·60	Very Good		51·00	2·80	53·80	1st Prize, Gold Medal
115	J. H. Smith-Barry's Post Obit ...	Mar. 23, 1904	May 27	132	42	14	2	2	20·17	V. Good	Ex.	34·00	9·20	43·20	Certificate of Merit
116	J. H. Smith-Barry's Marionette ..	Oct. 3, 1904	July 23	75	45	4	2	0¼	22·44	Very Good		32·25	3·50	35·75	Certificate of Merit
118	H. P. Smith's Ivy	Nov. 4, 1906	Sept. 11	25	26	10	1	8½	17·38	Pale	Good	24·50	Nil	24·50	
132	J. H. Smith-Barry's New Year's Gift	Jan. 1, 1907	May 23	136	34	4	1	7¾	23·07	Good		23·75	9·60	33·35	Certificate of Merit

BUTTER TEST—JERSEYS—*Continued.*

No. in Catalogue	Name of Cow	CHURNING—TIME AND TEMPERATURE					
		Time			Temperature		
		Churning began	Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished
				Minutes	Degrees	Degrees	Degrees
87	Vanilla 2nd	8 58	10 5	67	64	52	57
89	Primate's Pearl	9 1	9 56	55	64	52	56
90	Mrs. Viola	9 9	9 55	46	64	52	55
91	Lovely Venus	9 13	9 46	33	64	52	55
94	Dairymaid	9 19	10 13	54	64	52	56
96	Ripple 4th	9 22	10 0	38	64	52	55
97	Brown Fancy	10 5	10 46	41	62	52	56
98	Punctuality	10 18	11 3	45	63	52	54
100	Primrose Planet	10 28	11 3	35	65	52	55
101	Lucy's Wonder	10 22	10 56	34	64	52	57
102	Olivette 3rd	10 34	11 0	26	65	52	56
104	Muscotah	10 43	11 19	36	65	52	57
106	Belfry	10 59	11 22	53	65	52	55
107	Ghezireh	11 12	11 40	28	65	52	55
108	Mary	11 25	12 3	38	65	52	56
110	Warder's Queen	11 36	12 7	31	65	52	55
113	Loulah 3rd	11 30	12 20	50	65	52	58
114	Marigold	11 46	12 16	30	65	52	57
115	Post Obit	11 55	12 22	27	66	52	55
116	Marionette	12 6	1 0	54	66	52	58
118	Ivy	12 16	12 51	35	66	52	58
132	New Year's Gift	12 26	12 58	32	66	52	56

BUTTER TEST—SHORTHORNS.

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf	Number of days in Milk	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total lbs	ozs	Butter Yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards
3	Lord Rothschild's Darlington Cranford	11	10	1	May 27	132	27	13	24	11	52	8	1	10¾	31 ·40	Pale	Good	26 ·75	9 ·20	35 ·95	H. Commendation
4	Lord Rothschild's Dorothy	8	4	1	July 25	73	36	5	29	8	65	13	1	2½	56 ·91	Pale	Poor	18 ·50	3 ·30	21 ·80	
6	R. W. Hobbs & Sons' Spotless 23rd	9	5	0	Aug. 24	43	26	3	22	3	48	6	1	13¼	26 ·46	Pale	Fair	29 ·25	0 ·30	29 ·55	
7	R. W. Hobbs & Sons' Providers Welcome	5	4	2	Sept. 16	20	20	3	21	3	41	6	1	2	36 ·77	Poor	Poor	18 ·00	—	18 ·00	
13	George W. Tyser's Lady Lee 21st	7	8	0	July 4	94	23	10	22	2	45	12	1	4¾	35 ·27	Good	Good	20 ·75	5 ·40	26 ·15	
15	Samuel Sanday's Eaglethorpe Amy 5th	5	1	2	June 10	118	23	10	20	2	43	12	1	5¾	32 ·18	Pale	Fair	21 ·75	7 ·80	29 ·55	
18	Mrs. A. G. F. Thornton's Ring	6	7	1	Aug. 19	48	15	14	21	10	37	8	1	11½	21 ·81	Good	Good	27 ·50	0 ·80	28 ·30	
22	Duke of Portland's Darlington Cranford 6th	8	7	2	July 30	68	28	0	25	11	53	11	2	3¼	24 ·36	Pale	Fair	35 ·25	2 ·80	38 ·05	H. Commendation
23	Geo. B. Nelson's Pear Drop	9	0	0	Sept. 12	24	24	14	22	3	47	1	2	4	20 ·91	Ex.	Ex.	36 ·00	—	36 ·00	H. Commendation
25	Tom Hunter's Cherry Star	5	9	3	Sept. 15	21	27	14	21	5	49	3	2	7½	19 ·92	Good	V. Good	39 ·50	—	39 ·50	H. Commendation
27	Samuel Sanday's Raspberry	7	0	0	Sept. 15	21	32	0	25	3	57	3	2	12¼	20 ·67	Fair	Fair	44 ·25	—	44 ·25	2nd Prize and Bronze Medal
29	Jas. Sheppy's Filpail	5	0	0	June 25	103	20	14	26	0	46	14	1	9	30 ·0	Pale	Good	25 ·00	6 ·30	31 ·30	
30	C. F. Clay's Daisy....	6	2	1	Sept. 11	25	29	3	28	6	57	9	1	11¾	33 ·18	Fair	Fair	27 ·75	—	27 ·75	
31	J. L. Shirley's Millicent	7	0	0	July 5	93	35	3	28	2	63	5	1	10	38 ·96	V. Pale	Fair	26 ·00	5 ·30	31 ·30	

BUTTER TEST—SHORTHORNS—*Continued.*

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf	Number of days in Milk	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total lbs	ozs	Butter yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter: Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards
32	J. L. Shirley's Minerva	4	0	0	Sept. 15	21	23	5	23	2	46	7	1	$2\frac{1}{4}$	40·71	Fair	V. Good	18·25	—	18·25	
33	J. L. Shirley's Mamie	6	0	0	Sept. 16	20	30	11	31	2	61	13	2	8	24·72	V. Pale	Poor	40·00	—	40·00	V. H. Commendation
38	G. B. Nelson's Red Rose	7	0	0	July 29	69	28	2	20	8	48	10	2	$5\frac{1}{4}$	20·88	Ex.	Ex.	37·25	2·90	40·15	V. H. Commendation
40	G. B. Nelson's Buttercup	8	0	0	Sept. 20	16	28	11	26	10	55	5	2	$12\frac{1}{4}$	20·00	V. Good	Fair	44·25	—	44·25	R. & V. H. Commendation
46	Tom Hunter's Elsie ..	5	3	0	Sept. 12	24	25	5	22	6	47	11	2	$1\frac{3}{4}$	22·60	Ex.	Fair	33·75	—	33·75	H. Commendation
49	Fred Scorer's Bracebridge Fulletby	9	0	0	Sept. 9	27	13	14	24	2	38	0	2	3	17·37	Pale	Fair	35·00	—	35·00	H. Commendation
50	Fred Scorer's Cadeby Belle	7	0	0	June 10	118	20	6	18	14	39	4	1	7	27·30	Good	Fair	23·00	7·80	30·80	
51	Fred Scorer's Bracebridge No. 26b	5	6	0	Aug. 2	65	24	0	22	2	46	2	1	$9\frac{3}{4}$	28·66	Good	Good	25·75	2·5	28·25	
52	John Evens' Burton Quality 5th	4	8	0	Aug. 25	42	20	8	21	10	42	2	1	$13\frac{1}{4}$	23·04	Ex.	Ex.	29·25	·20	29·45	H. Commendation
53	John Evens' Burton Ruby 12th	3	10	0	Sept. 2	34	23	14	19	14	43	12	1	$5\frac{1}{4}$	32·94	VGood	VGood	21·25	—	21·25	
54	John Evens' Burton Nancy 5th	7	6	0	Sept. 8	28	33	8	29	10	63	2	3	2	20·20	Ex.	Good	50·00	—	50·00	1st Prize and Silver Medal
55	John Evens' Burton Ruddy 5th	7	11	0	Sept. 17	19	25	15	23	10	49	9	1	$10\frac{1}{4}$	30·20	Pale	Good	26·25	—	26·25	
56	John Evens' Burton Spotted 5th	6	6	0	Sept. 13	23	31	2	28	10	59	12	2	$3\frac{3}{4}$	26·74	Good	V. Good	35·75	—	35·75	H. Commendation

BUTTER TEST—SHORTHORNS—*Continued.*

No. in Catalogue	Name of Cow	CHURNING—TIME AND TEMPERATURE: Time			Temperature		
		Churning began	Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished.
				Minutes	Degrees	Degrees	Degrees
3	Darlington Cranford	9 3	9 50	47	64	52	61
4	Dorothy	9 9	11 10	121	64	52	62
6	Spotless 23rd	9 11	9 40	29	64	52	58
7	Provider's Welcome	2 12	2 37	25	66	52	56
13	Lady Lee 21st	8 58	9 35	37	64	52	60
15	Eaglethorpe Amy 5th	9 5	9 35	30	64	52	60
18	Ring	9 14	10 0	46	64	52	60
22	Darlington Cranford 6th	9 45	10 25	40	63	52	54
23	Pear Drop	9 50	10 10	20	63	52	54
25	Cherry Star	10 5	10 26	21	63	52	57
27	Raspberry	10 0	10 20	20	64	52	56
29	Filpail	10 30	10 56	26	65	52	59
30	Daisy	10 30	10 50	20	65	52	55
31	Millicent	9 45	10 20	35	64	52	59
32	Minerva	10 25	10 35	10	64	52	53
33	Mamie	10 45	11 0	15	65	52	54
38	Red Rose	10 38	11 15	37	65	52	58
40	Buttercup	10 35	10 50	15	65	52	55
46	Elsie	12 10	12 35	25	66	52	54
49	Bracebridge Fulletby	11 17	11 32	15	65	52	55
50	Cadeby Belle	11 30	12 15	45	65	52	59
51	Bracebridge No. 26b	11 0	11 45	45	65	52	59
52	Burton Quality 5th	2 14	2 40	26	66	52	60
53	Burton Ruby 12th	10 55	11 15	20	65	52	58
54	Burton Nancy 5th	11 12	11 34	22	65	52	58
55	Burton Ruddy 5th	11 20	12 5	45	65	52	58
56	Burton Spotted 5th	12 15	12 35	20	66	52	60

BUTTER TEST—COWS OTHER THAN SHORTHORNS OR JERSEYS.

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf	Number of days in Milk	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total lbs	ozs	Butter Yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter: Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards
153	Sir Henry Lennard's Lady No. 88	7	5	1	July 12	86	18	8	13	8	32	0	1	8¼	21·11	V.Good	Good	24·25	4·60	28·85	
156	Cecil F. Dixon's Rose of the Spurs 4th	11	7	3	Aug. 20	47	19	3	16	2	35	10	1	11	21·11	Good	Good	27·00	0·70	27·70	
162	Earl of Radnor's Mona	7	8	2	Sept. 16	20	27	10	26	10	54	4	1	12	31·00	V.Good	Good	28·00	—	28·00	
163	Alfred J. Smith's Rendlesham Abigail	9	0	0	Aug. 8	59	20	0	25	11	45	11	1	2¾	38·98	Good	V.Good	18·75	1·90	20·65	
164	Alfred J. Smith's Rendlesham Fay	7	5	0	April 24	165	18	10	16	11	35	5	0	12½	45·20	Good	Good	12·50	12·00	24·50	
165	R. Eaton White's Bounty	5	6	0	June 27	101	16	3	15	3	31	6	1	6¼	22·56	Good	Good	22·25	6·10	28·35	
182	W. & H. Whitley's Peeper 2nd	5	9	0	July 8	90	8	8	15	2	23	10	1	1¾	21·29	Ex.	Ex.	17·75	5·00	22·75	
183	W. & H. Whitley's Fancy	12	2	2	Aug. 26	41	27	14	26	2	54	0	2	5¾	22·88	Ex.	Ex.	37·75	0·10	37·85	H. Commendation
184	W. P. Vosper's Fancy 4th	10	8	3	May 6	153	22	5	19	8	41	13	1	10	25·73	Good	Ex.	26·00	9·00	35·00	H. Commendation
186	W. P. Vosper's Ladybird 3rd	10	10	0	May 21	138	26	3	26	0	52	3	1	13¼	28·54	Ex.	Ex.	29·25	9·80	39·05	Prize of £3
187	Muriel Countess de la Warr's Buckhurst Peaceful	10	3	1	Aug. 30	37	15	3	14	7	29	10	1	5	22·57	Ex.	Ex.	21·00	—	21·00	
188	Muriel Countess de la Warr's Buckhurst (Waterville) Saffhire	10	0	0	June 15	113	13	10	14	2	27	12	1	7	19·30	Ex.	Ex.	23·00	7·30	30·30	

BUTTER TEST—COWS OTHER THAN SHORTHORNS OR JERSEYS—*Continued.*

No. in Catalogue	Name of Cow.	CHURNING—TIME AND TEMPERATURE					
		Time			Temperature		
		Churning began	Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished
				Minutes	Degrees	Degrees	Degrees
153	Lady No. 88	11 25	11 40	15	65	52	58
156	Rose of the Spurs 4th	1 55	2 22	27	66	52	58
162	Mona	1 56	2 15	19	66	52	60
163	Rendlesham Abigail	11 44	12 35	51	65	52	58
164	Rendlesham Fay	11 52	12 25	33	65	52	60
165	Bounty	1 57	2 19	22	66	52	60
182	Peeper 2nd	11 50	12 6	16	65	52	59
183	Fancy	1 58	2 10	12	66	52	60
184	Fancy 4th	11 50	12 15	25	65	52	57
186	Ladybird 3rd	2 10	2 39	29	66	52	58
187	Buckhurst Peaceful	2 8	2 34	26	66	32	58
188	Buckhurst (Waterville) Saffhire ..	2 6	2 30	24	66	52	55

TABLE I.—NUMBER OF CATTLE TESTED SINCE 1897.

Breed	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Shorthorns	9	23	21	22	15	31	18	14	17	22	26	26	19
Lincoln Reds	—	—	—	—	—	—	—	—	—	—	7	9	8
Jerseys	14	17	15	29	25	30	20	12	18	13	13	16	22
Guernseys............	3	5	4	7	8	1	5	3	3	2	2	2	2
Red Polls	7	4	9	7	2	6	5	4	11	12	11	3	4
Ayrshires	3	1	2	—	1	1	—	1	3	2	—	4	—
South Devons	—	—	—	—	—	—	2	2	3	5	—	—	4
Dutch.................	1	—	—	—	—	—	1	—	—	—	—	—	—
Kerries and Dexters	—	1	2	—	1	2	—	2	1	2	2	5	2
Welsh	—	1	1	1	—	—	—	—	—	—	—	—	—
Cross-breds	4	1	6	2	2	11	8	6	8	10	—	—	—
	41	53	60	68	54	82	59	44	64	68	61	65	61

TABLE II.—NUMBER OF CATTLE OF THE VARIOUS BREEDS TESTED SINCE 1895, WITH THEIR AVERAGE PERIOD OF LACTATION, WEIGHT OF BUTTER, BUTTER RATIOS, AND POINTS.

Year	No.	Breed	Average No. of Days in Milk	Average Weight of Butter		Average Butter Ratio	Average No. of Points
				lbs.	ozs.	lbs.	
From 1895 to 1900	106	Shorthorns...	50½	1	11	28·81	—
1901	15	,, ...	44	2	0½	26·69	33·69
1902	31	,, ...	50	1	11½	27·38	23·89
1903	18	,, ...	41	1	11	38·59	28·44
1904	14	,, ...	41½	1	10	29·31	27·47
1905	17	,, ...	53	1	13½	27·65	31·25
1906	22	,, ...	58	1	6¾	32·87	25·08
1907	26	,, ...	62	1	11¾	29·23	30·24
1908	*35	,, ...	49	1	11	29·39	28·05
1909	19	,, ...	54	1	14	27·25	32·31
,, 1907	7	Lincoln Reds	57	1	13½	28·31	31·91
1908	9	,, ...	61	1	12	28·00	30·60
1909	8	,, ...	44	1	14¾	24·81	32·09
,, 1895 to 1900	126	Jerseys ...	99	1	10¼	19·15	—
1901	25	,, ...	141	1	9½	17·80	34·44
1902	30	,, ...	124	1	10	18·46	33·19
1903	20	,, ...	141	1	11	18·12	36·13
1904	12	,, ...	117	1	13½	19·62	36·79
1905	18	,, ...	134	1	10¾	19·48	35·51
1906	13	,, ...	119	1	10¼	20·89	33·49
1907	13	,, ...	111	1	11	19·71	34·49
1908	16	,, ...	115	1	7¼	22·35	30·00
1909	22	,, ...	116	1	13½	18·36	37·12
,, 1895 to 1900	23	Guernseys ...	71¾	1	9½	21·86	—
1901	8	,, ...	81	1	8¾	21·43	29·51
1902	1	,, ...	17	1	3¾	21·46	19·75
1903	5	,, ...	52	1	1	27·77	18·93
1904	3	,, ...	98¼	1	10	20·65	31·91
1905	3	,, ...	165⅔	1	6¾	19·66	31·78
1906	2	,, ...	138	1	3¼	27·00	28·45
1907	2	,, ...	82	1	12½	18·90	33·48
1908	2	,, ...	142	1	13½	19·47	37·90
1909	2	,, ...	66	1	9½	21·13	28·27
,, 1895 to 1900	30	Red Polls ...	60½	1	4¾	30·29	—
1901	2	,, ...	80	1	8⅝	25·50	28·77
1902	6	,, ...	83	1	6⅛	26·84	26·92
1903	5	,, ...	124	1	0	39·60	21·39
1904	4	,, ...	115½	1	5½	30·34	29·06
1905	11	,, ...	74½	1	3½	28·78	22·76
1906	12	,, ...	76	0	15	39·15	18·81
1907	11	,, ...	99	1	2¼	33·21	23·96
1908	3	,, ...	92	1	1	35·00	22·16
1909	4	,, ...	86	1	4½	32·73	25·37

* These figures include the 9 Lincoln Red Shorthorns

TABLE II.—NUMBER OF CATTLE OF THE VARIOUS BREEDS TESTED SINCE 1895, WITH THEIR AVERAGE PERIOD OF LACTATION, WEIGHT OF BUTTER, BUTTER RATIOS, AND POINTS—*Continued.*

Year	No.	Breed	Average No. of Days in Milk	Average Weight of Butter	Average Butter Ratio	Average No. of Points
From 1896 to 1900	8	Ayrshires ...	52	1 13¼	26·35	—
1901	1	,, ...	125	1 7½	27·65	32·10
1902	1	,, ...	33	1 3½	18·00	19·50
1903	0	,, ...	—	—	—	—
1904	1	,, ...	116	0 12½	35·20	20·10
1905	3	,, ...	77	1 2⅓	28·07	22·88
1906	2	,, ...	23	1 11¾	25·51	27·7
1907	—	,, ...	—	—	—	—
1908	4	,, ...	75	1 2	35·19	21·00
1909	—	,, ...	—	—	—	—
,, 1909	4	South Devons	105	1 13¾	24·77	33·66
,, 1896 to 1900	3	Dexters and Kerries	117	0 14¾	40·80	—
1901	1	,, ...	83	1 6¼	21·17	26·55
1902	2	,, ...	46	1 7⅜	21·28	23·49
1903	0	,, ...	—	—	—	—
1904	2	,, ...	72	0 14¾	21·31	18·45
1905	1	,, ...	149	1 1¼	23·47	28·15
1906	2	,, ...	33	1 13	22·4	29·10
1907	2	,, ...	65	1 11¼	21·06	29·7
1908	5	,, ...	124	1 6	24·47	29·13
1909	2	Kerries ...	75	1 6	20·86	25·65

Table III.—Average Yield of Butter of the different Breeds at different periods.

Year	Breed	No. of Cows.	Days in Milk, 50	No. of Cows	Days in Milk. 100	No. of Cows	Days in Milk, 135	No. of Cows	Days in Milk, 190
			lbs. ozs.		lbs. ozs.		lbs. ozs.		lbs. ozs.
1895 to 1900	Shorthorns	19	1 $12\frac{1}{2}$	6	1 $7\frac{1}{2}$	2	1 $4\frac{4}{8}$	8	1 $1\frac{1}{2}$
1901	,,	2	1 8	—	—	1	2 6	—	—
1902	,,	6	1 $10\frac{1}{2}$	—	—	1	1 11	—	—
1903	,,	3	1 7	—	—	1	1 $6\frac{1}{4}$	—	—
1904	,,	3	1 $10\frac{1}{3}$	1	1 $14\frac{1}{4}$	—	—	—	—
1905	,,	2	1 1	1	2 $0\frac{1}{2}$	2	1 $7\frac{3}{4}$	—	—
1906	,,	11	1 $8\frac{1}{2}$	3	1 $3\frac{1}{2}$	—	—	—	—
1907	,,	11	1 $9\frac{1}{3}$	2	1 $9\frac{3}{4}$	1	0 $15\frac{3}{4}$	—	—
1908	,,	11	1 $11\frac{3}{4}$	—	—	2	1 12	—	—
1909	,,	11	2 $0\frac{1}{2}$	5	1 $11\frac{1}{2}$	3	1 $8\frac{1}{2}$	—	—
1907	Lincoln Reds	3	1 12	1	1 11	—	—	—	—
1909	,,	6	2 1	1	1 $9\frac{3}{4}$	1	1 7	—	—
1895 to 1900	Jerseys	23	1 $10\frac{1}{4}$	15	1 $8\frac{1}{3}$	11	1 $8\frac{1}{6}$	31	1 $10\frac{1}{2}$
1901	,,	1	1 12	8	1 $7\frac{3}{4}$	6	1 9	12	1 $10\frac{1}{2}$
1902	,,	4	1 $9\frac{3}{16}$	3	1 $8\frac{2}{3}$	2	1 14	9	1 11
1903	,,	4	1 $9\frac{1}{8}$	5	1 15	9	1 $9\frac{2}{3}$	2	1 $9\frac{3}{4}$
1904	,,	2	1 $10\frac{1}{8}$	3	2 $2\frac{1}{3}$	4	2 $0\frac{1}{16}$	1	1 $13\frac{1}{2}$
1905	,,	3	1 $8\frac{1}{2}$	4	1 $15\frac{1}{2}$	8	1 $9\frac{1}{4}$	2	1 $8\frac{1}{2}$
1906	,,	5	1 $10\frac{3}{4}$	3	1 $3\frac{3}{4}$	4	1 $15\frac{3}{4}$	1	1 $5\frac{1}{2}$
1907	,,	6	1 $13\frac{1}{5}$	2	1 $7\frac{7}{8}$	3	1 13	1	1 $4\frac{3}{4}$
1908	,,	4	1 $14\frac{1}{2}$	3	1 10	4	1 1	2	1 2
1909	,,	3	1 3	4	2 $2\frac{1}{2}$	6	1 $14\frac{3}{4}$	9	1 12
1895 to 1900	Guernseys	3	1 $7\frac{1}{3}$	4	1 $7\frac{1}{2}$	3	1 $4\frac{5}{8}$	1	1 8
1901	,,	1	1 $15\frac{1}{4}$	2	1 $5\frac{3}{4}$	—	—	2	1 $8\frac{5}{8}$
1902	,,	—	—	—	—	—	—	—	—
1903	,,	2	0 $15\frac{1}{4}$	—	—	—	—	—	—
1904	,,	2	1 $6\frac{3}{4}$	—	—	1	2 $0\frac{1}{2}$	—	—
1905	,,	1	1 $10\frac{1}{2}$	—	—	1	1 $12\frac{1}{4}$	1	0 $13\frac{1}{2}$
1906	,,	—	—	1	1 1	1	1 $5\frac{1}{2}$	—	—
1907	,,	—	—	—	—	—	—	1	1 14
1908	,,	1	1 13	—	—	—	—	1	1 14
1909	,,	1	1 11	1	1 $8\frac{1}{4}$	—	—	—	—
1895 to 1900	Red Polls	10	1 $4\frac{1}{2}$	2	1 8	2	0 $12\frac{3}{4}$	1	0 11
1901	,,	—	—	2	1 $8\frac{5}{8}$	—	—	1	—
1902	,,	—	—	3	1 8	—	—	—	1 $2\frac{1}{4}$
1903	,,	1	0 $13\frac{3}{4}$	1	1 $1\frac{1}{4}$	—	—	1	0 13
1904	,,	1	1 13	2	1 1	1	1 $7\frac{1}{4}$	—	—
1905	,,	3	1 1	2	1 5	—	—	1	0 12
1906	,,	7	1 0	—	—	2	0 $14\frac{1}{2}$	—	—
1907	,,	5	1 4	—	—	4	1 $1\frac{1}{4}$	—	—
1908*	,,	1	1 $2\frac{3}{4}$	—	—	—	—	1	1 1
1909	,,	1	1 12	1	1 $2\frac{3}{4}$	1	1 $6\frac{1}{4}$	1	0 $12\frac{1}{2}$
1908	Ayrshires	—	—	—	—	—	—	1	0 12
1909	,,	—	—	—	—	—	—	—	—
1909	South Devons	1	2 $5\frac{3}{4}$	1	1 $1\frac{3}{4}$	—	—	2	1 $11\frac{1}{2}$
1908	Kerries & Dexters	—	—	—	—	1	0 14	2	1 2
1909	,,	1	1 5	—	—	1	1 7	—	—

TABLE IV.—COMPARISONS OF CHURNINGS WITH ANALYSES.

SHORTHORNS.

No. in Catalogue	Weight of Butter Churned		Total Fat shown by Chemical Analyses		No. in Catalogue	Weight of Butter Churned		Total Fat shown by Chemical Analyses	
	lbs.	ozs.	lbs.	ozs.		lbs.	ozs.	lbs.	ozs.
3	1	10¾	1	13	27	2	12¼	2	8¾
4	1	2½	1	6	29	1	9	1	8
6	1	13¼	2	2	30	1	11¾	1	14¼
7	1	2	1	10	31	1	10	1	14¼
13	1	4¾	1	7	32	1	2¼	1	0¾
15	1	5¾	1	6½	33	2	8	2	10½
18	1	11½	1	8¾	38	2	5¼	2	0¾
22	2	3¼	2	1	40	2	12¼	2	9¼
23	2	4	2	2	46	2	1¾	2	0¾
25	2	7½	2	3¼		35	9¾	35	14¾

LINCOLNSHIRE RED SHORTHORNS.

49	2	3	2	3¼	54	3	2	3	0¼
50	1	7	1	7¼	55	1	10¼	1	3½
51	1	9¾	1	11¼	56	2	3¾	1	14¾
52	1	13¼	1	10½					
						14	1	13	7¾

N.B.—No. 53 is not included in the above, as the milk was not analysed.

JERSEYS.

87	1	5	1	4¾	102	1	4½	1	4
89	2	0¼	1	11¼	104	2	1¼	1	15¼
90	1	14½	1	13¼	106	1	12¼	1	10¾
91	1	15	1	12¾	107	2	3¼	1	15
94	1	6	1	6	108	2	4¾	2	2¾
96	1	12¼	1	11¼	110	1	9	1	7
97	1	10¾	1	8¼	113	1	7¼	1	6½
98	1	13¼	1	13	114	3	3	2	15¾
100	2	7¼	2	6¾	115	2	2	2	2¼
101	1	6¾	1	8¾	116	2	0¼	1	15
						37	10½	35	14¼

N.B.—Nos. 118 and 132 are not included, as the milk was not analysed.

GUERNSEYS.

153	1	8¼	1	13¼	156	1	11	1	11
						3	3¼	3	8¼

RED POLLS.

162	1	12	1	12	164	0	12½	1	2¼
163	1	2¾	1	5¼	165	1	6¼	1	8
						5	1½	5	11½

SOUTH DEVONS.

182	1	1¾	1	2¼	184	1	10	1	9
183	2	5¾	2	6	186	1	13¼	1	15¼
						6	14¾	7	0¼

KERRIES.

187	1	5	1	2½	188	1	7	1	7¾
						2	12	2	10¼

Table V.—Average Differences between Churnings and Chemical Analyses from 1898 to 1909 inclusive.

Year	Breed	Churn	Analyses
		Lbs. Butter	Lbs. Fat
1898	Shorthorns	38·92	36·82
1899	,, ...	34·34	32·46
1900	,, ...	35·55	37·87
1901	,, ...	29·05	27·80
1902	,, ...	53·48	55·91
1903	,, ...	30·72	35·92
1904	,, ...	22·98	26·59
1905	,, ...	30·89	30·58
1906	,, ...	31·38	33·59
1907	,, ...	45·14	47·79
1908	,, ...	43·74	49·78
1909	,, ...	35·06	35·91
1907	Lincoln Red Shorthorns	12·94	12·31
1908	,, ,, ,, ...	15·79	15·56
1909	,, ,, ,, ...	14·06	13·48
1898	Jerseys	29·15	27·26
1899	,, ...	23·61	22·54
1900	,, ...	39·75	39·32
1901	,, ...	33·19	31·82
1902	,, ...	43·61	41·03
1903	,, ...	27·04	26·41
1904	,, ...	22·22	22·06
1905	,, ...	24·53	22·44
1906	,, ...	19·56	18·71
1907	,, ...	22·64	—
1908	,, ...	22·25	—
1909	,, ...	37·65	35·89
1898	Guernseys	8·07	8·25
1899	,, ...	5·90	5·53
1900	,, ...	10·84	11·10
1901	,, ...	12·46	11·59
1902	,, ...	1·23	1·34
1903	,, ...	5·34	6·47
1904	,, ...	4·89	4·94
1905	,, ...	3·42	3·42
1906	,, ...	2·41	1·82
1907	,, ...	3·54	3·22
1908	,, ...	3·69	3·52
1909	,, ...	3·20	3·52

TABLE V.—AVERAGE DIFFERENCES BETWEEN CHURNINGS AND CHEMICAL ANALYSES FROM 1898 TO 1909 INCLUSIVE—*Continued.*

Year	Breed	Churn	Analyses
		Lbs. Butter	Lbs. Butter
1898	Red Polls...	5·04	5·56
1899	,, ...	8·48	8·33
1900	,, ...	8·98	9·81
1901	,, ...	3·07	2·88
1902	,, ...	8·36	8·00
1903	,, ...	5·01	6·95
1904	,, ...	5·39	6·00
1905	,, ...	13·42	14·53
1906	,, ...	11·39	14·50
1907	,, ...	12·53	16·08
1908	,, ...	3·21	4·06
1909	,, ...	5·09	5·71
1909	South Devons	6·89	7·03
1907	Kerries	3·40	3·19
1908	Kerries and Dexters	6·89	7·09
1909	Kerries	2·75	2·64

THE POULTRY SECTION.

By L. C. Verrey.

Again I have the pleasure to report that the Poultry Section of the Dairy Show proved a great success, and despite the fact that there was a slight decrease in the number of entries from that of 1908, the total of 2,997 pens compares very favourably with previous years. The slight shrinkage in numbers can easily be accounted for by the unfavourable weather that prevailed during the early portion of the breeding season and the absence of sun during last spring and summer. As on former occasions, the section opened with the classes devoted to Table fowls, and a capital display these made, the quality throughout being excellent. The couple of Dorking cockerels which were awarded the first prize and silver medal were particularly meritorious, being very plump and white. Twenty-one couples of any other pure-bred cockerels were staged and nineteen couples of pullets, the premier honours in each class going to birds of the Sussex breed. In the class for Dorkings crossed with any other pure breed excellent quality was again manifest; the Gold Medal offered by the Worshipful Company of Poulters for the best exhibit in the dead poultry section was awarded to the first prize couple of Indian Game-Dorking cockerels, a well-matched pair of extra size and fine white flesh. The two classes for "Any Other Cross-bred Fowls" filled well, there being 21 couples of cockerels and 17 pairs of pullets, the winners in both these classes being of the Indian Game-Buff Orpington cross. The two special classes for couples of unfatted cockerels and pullets proved very interesting, the exhibits being numerous, of which the majority were fine in quality. Ducks were about the average, but the goslings formed a good collection, and certainly an advance on last year.

Live poultry commenced with the breeding pens, placed in the Berners Hall. Again the improved wire pens were used, and these were staged in single tiers, so that the fowls could be seen to the best advantage, which was much appreciated by the judges and also the visitors. The class for feather-legged birds contained some fine specimens, particularly the quartet of Buff Cochins to which was awarded the first prize, light Brahmas being second and Faverolles third. Plymouth Rocks, Wyandottes, and Orpingtons competed together in the next class, but there was only one entry of the first-named variety. Wyandottes proved the victors by winning all three prizes. The remaining class for breeding pens contained examples of various other breeds of clean-legged fowls, a fine and typical pen of Brown Red Game winning, which were also awarded the Association Silver Medal for the best pen in the three classes; a splendid lot of Crêve Cœurs came second to these. It was quite a treat to see such fine specimens of this

handsome French breed, as opportunity is so seldom given of inspecting a quartet mated up. It is a pity that Crêves are not more cultivated, as they are not only handsome but also very useful. The third prize fell to a well-matched pen of Indian Game. These classes of breeding pens are not only highly interesting to all Fanciers, but also most instructive to the novice, affording him the opportunity of studying the points requisite in the various breeds necessary for the production of typical progeny.

Those good old English fowls, the Dorkings, headed the list of the single-bird pens, and proved a capital collection, size and quality being apparent throughout, the medal being awarded to a very fine coloured cockerel. Langshans were very good, and it was in the pullet class that was found the best bird in the Show, the first prize pullet, a bird of wonderful type and colour, not only gaining the silver medal for the best of her breed, but also the Champion Cup for the best feathered-legged exhibit, and the Association's Gold Medal for the best bird of the whole of the fowls in the Show. Croad Langshans do not appear to be largely cultivated, as there were only 20 entries in the two classes. Brahmas were about as usual, but Cochins proved most disappointing, no less than four out of the six classes having to be cancelled on account of insufficient entries. The two classes that remained only contained 12 entries between them. Judging from this state of things, it looks as though this once popular breed will ultimately find its way to that unsatisfactory place, the class for "Any Other Variety." Minorcas were quite a good lot, the medal being awarded to the first prize cockerel. Houdans and Faverolles mustered in great strength, many very fine examples of each breed being penned. It is worthy of note that the inclusion of Malines in the schedule for the first time proved a success.

Hamburghs and Modern Game were about on a par with previous Shows. On the other hand, there was a falling-off in numbers of Old English Game as compared with 1908, though the quality was maintained. The first prize Spangled pullet was awarded the silver medal for the best Old English, and subsequently the Champion Cup for the best clean-legged fowl in the Show.

Leghorns made a very fine display, no less than 20 Brown cockerels being staged. The Whites were certainly a great improvement on what have been seen at the Dairy Show during the past few years, the number of entries having considerably increased, whilst the type was far more like what it should be. The minor colours were only moderate; the new sub-variety, "the Blues," do not seem to fulfil the promise of the boom that was expected, and at present no very great improvement in the colour is discernible. The silver medal for the best Leghorn was won by a Duckwing pullet. Plymouth Rocks as usual came up strong, especially the Barreds, a charming pullet of this variety carrying off the coveted medal.

Wyandottes appear to have lost none of their popularity, the Whites particularly holding their own with 35 cockerels and 46 pullets, nearly all of which were of excellent quality, but the Blacks were not so far behind with 30 and 35 respectively. Altogether there were 332 in the Open classes and 108 in the Selling, making the grand total of 440 Wyandottes in the Agricultural Hall. Orpingtons pressed them hard for pride of place as to numbers, with 268 birds in the Open and 138 in the Selling classes, making a total of 406, the strongest classes being those for White pullets with 43 entries and Buff pullets with 51.

The Sussex breed is certainly gaining ground judging by the entries (81) in the four classes provided. The silver medal of the Association for the best was awarded to a speckled cockerel of good proportions. Anconas, Silkies, and Yokohamas were rather above the usual average, the cockerels of the latter breed being seen to advantage in the large pens. It was refreshing to see a Black Spanish winning in the "Any Other Variety" class for pullets.

Bantams always make a very nice display at the Dairy Show, and this year there was no exception to the rule, the total entry being excellent, whilst the quality left nothing to be desired. The modern Game were a splendid lot, and the Black-Red cock that won the silver medal of the section was a very typical representative of the variety. The Old English Game Bantams were particularly strong in numbers, as were also the Malays. The variety Bantams, that is, the non Game, made quite a little show of themselves, the medal going to a charming well-laced little Silver Sebright cock.

Turning to the Waterfowl Section, one must confess to being a little disappointed at the rather poor response of exhibitors to the liberal and extended classification provided by the Committee, for in the 17 Open Classes there were only 160 entries. The shortage was particularly noticeable in the Aylesbury and Pekin Classes. Cayugas made two capital classes. The Buff Orpington ducks appear as though they had come to stay, as the quality of the 24 pens on view showed a decided improvement on that of last year. The Geese were an exceptionally fine collection, numbering 43 in four classes, the old birds being particularly good. The Champion Cup for the best exhibit in the Waterfowl Section, also the silver medal for the best Goose or Gander, was awarded to the first prize Embden Gander, bred prior to 1909, a truly magnificent specimen. Turkeys were good all through, especially the Bronze. The White hens appear to be losing size, which is to be regretted, because the White variety are certainly very beautiful, and deserve to be more cultivated.

To sum up, the Poultry Section of the Dairy Show of 1909 can lay claim to equal, if not surpass, any of its predecessors as regards the general excellent quality of the exhibits, the whole being of that high standard which demonstrates the careful breeding and rearing bestowed on the birds to bring them to that point of perfection which is so requisite in these days of keen competition.

THE PIGEON SECTION.

By John H. Ross.

The entries in the Pigeon Section of the 1909 Dairy Show numbered 2,283. I am sorry to have to note a falling-off in the entry, not, I feel sure, for any lack of esteem in which the Show is held by exhibitors, for it is still the most popular Show in the Kingdom, but from the fact that the inclement summer considerably affected the breeding season, and the damp autumn kept the birds in a very backward state as regards the moult.

With the smaller entry the birds were staged to more advantage in the space allotted to them, and some breeds were far better off for light than in previous years.

Fantails led the classification with 59 pens against 108 in 1908. The decrease is accounted for mainly by the absence of Mr. G. E. Gray's team, as this gentleman has refrained from exhibiting at any of the large Shows this year. The judge spoke very highly of the winning young white hen (pen 3084, F. Jarvis). The Blacks were also very good, but the Blues and Saddles were not as good as Mr. Marshall Harvey had seen at the Dairy Show.

The entries in Pouters were very poor, and two out of the four classes were cancelled. Pigmy Pouters also showed a small decrease, the class for "Any other colour" bred in 1909 being the best filled with 19 entries.

Carriers were quite up to the average, and both the yearling and young classes showed a great improvement in style and general quality.

Barbs are never very numerous, but this year the young classes were exceptionally weak.

Dragoons (306) mustered about the same strength as in 1908, and although the adult and yearling classes showed an increase, the young birds were 25 less. The judge of the former reports that the quality of the exhibits was not equal to former years with one or two exceptions. One of these being the winning adult Chequer cock (pen 3299, W. H. Johnston), which also won the Champion Cup for the best pigeon in the Show. In young birds the Blues and Chequers were not nearly so strong, but on the other hand Yellows and Whites were rather better supported.

I am pleased to note a revival of interest in Short-faced Tumblers, the six classes bringing together 79 entries, against 52 in 1908. The Medal of the Association for the best young bird went to a very pretty Yellow Self Hen (pen 3671, A. Wilson). Long-faced Tumblers showed a better average this year, the numbers being 231 in 18 classes, against 252 in 25 classes in 1908. The quality was well up to the standard. In the class for young Black

Selfs, the competition was exceptionally keen, quite a dozen out of the 31 entries being good enough to win. Having tried several classifications for this variety, I certainly think that the present one has met with the greatest success, and should advise its continuance.

English Owls (63) are generally disappointing as to numbers, and this year was no exception, the yearling hen class being cancelled for want of support. An English Owl (pen 3968, W. Watmough) had the honour of winning the Esquilant Trophy, offered this year for the best Short-faced Tumbler—Barb, English, or Foreign Owl, or Turbit bred in the current year.

Turbits mustered only 90 in 12 classes, against 139 last year. The judge reports that as a whole they were very poor, both in standard and condition, the latter due probably to the very bad season. The winner of the Association Medal for the best young bird was won by Mr. G. H. Widger (pen 4050), with a really good young Blue cock.

There were 50 Archangels in the 4 classes, against 68 in 1908, and were on the whole a very fair lot. The adult hen class was the strongest in quality, which is unusual.

Jacobins numbered exactly the same as in 1908, viz., 80 pens in six classes, which I consider very satisfactory, as very few birds of this variety are through the moult by October. The judge again suggests that the class for young Reds and Yellows should be divided, and I am inclined to think that perhaps this might prove a popular addition.

Nuns appear to be regaining popular interest, and numbered 29 in the two classes. For the first time on record the Fulton Trophy was won by one of this variety, the trophy being competed for this year by the young birds of the following varieties, viz., Archangels, Magpies, Nuns, and Long-faced Tumblers.

Orientals were disappointing, for with two classes cancelled they totalled 120 against 176 in 1908. As usual, the best-filled classes were those for birds bred in the current year, Satinettes, etc., (19) being the strongest. The quality, however, was well up to former years.

There were 139 Magpies, compared with 171 in 1908, but the quality was quite up to the standard of previous Dairy Shows. The winner of the Association Medal for the best Magpie (pen 4388, F. Warner) stood well away from the rest. Yellows and Blues were very good, and showed improvement in type.

Scanderoons, Swallows, and German Toys were just average classes.

Antwerps had an increase of a dozen entries, and the interest in this old variety seems to be once again in the ascendant.

The classes provided for Show Homers as usual were well supported, 201 being nearly a record for this Show. The judge considered there was a great advancement in type, combined with

quality. The trophy of the United Show Homer Club fell to the young Red Chequer cock (pen 4765, T. Adams). This bird also secured the Association's Silver Medal for the best Show Homer bred in 1909. The young classes for Blue or Black Chequer were exceptionally well filled, there being no less than 28 cocks and 29 hens.

Cumulets showed an advance of 10 pens. The interesting Working Homers, although 30 short of last year's figures, were a splendid collection, but many birds were severely handicapped by being still in the moult. Condition is everything in a Working Homer.

Exhibition Flying Homers appeared for the first time in our schedule, and met with great success, 69 entries in six classes, and I think with a slight alteration in the old bird classification this variety has come to stay at the Dairy Show.

As usual, the various Selling Classes were well filled, and proved a source of profit to the Society from the sales effected.

PRELIMINARY REPORT OF AN "INVESTIGATION INTO THE CELLULAR ELEMENTS PRESENT IN MILK."

(FOR THE BRITISH DAIRY FARMERS' ASSOCIATION.)

BY

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That cellular elements are found normally in milk has been known for many years, but it is only comparatively recently that any importance from a public health point of view has been attached to their presence. These cellular elements being usually regarded as leucocytes or pus cells, it is natural that their occurrence in milk should be looked on as indicative of an inflammatory process in the udder of the cow or cows from which the milk was obtained. The first observers to make any attempt to arrive at the numbers of these cells in milk seem to be Stokes and Wegefarth (1) in 1897. Their method, however, was very crude, and is not suited for making a true enumeration. Stewart (2) and Slack (3) followed with a very similar method, except that special tubes were used for obtaining the deposit. This "smeared sediment method" as it is called, is, however, capable of great inexactitude. Later observers have, by the use of ordinary blood counters, made the counting of the cells in milk a scientific measurement of reasonable accuracy. To Doane and Buckley (4) belongs the credit for the first published use of such a method. Savage (5) however has made the process still more accurate by first diluting the milk before centrifugalisation, and also by counting all over the field of the blood chamber, two innovations which are of very great importance, as has been borne out by our investigations. Error is easily introduced if counting is confined to the ruled divisions of the counter. Recently, Trommsdorff (6) has used a method based on

(1) Stokes and Wegefarth.—"Jour. of State Med.," 1897, p. 439.
(2) Stewart.—"American Medicine," 1905, No. 9.
(3) Slack.—"Jour. Inf. Diseases," 1906, Sup. No. 2.
(4) Doane and Buckley.—"Maryland Agri. Exp. Station," 1905, Bul. 102.
(5) Savage.—"Jour. of Hyg.," 1906, p. 123.
(6) Trommsdorff.—"Münch. Med." Wochenschrift, 1906, 12.

the measurement of the deposit obtained on rotation in a graduated tube, and this method, probably on account of its ease and speed, has found much favour in Germany. It has been severely criticised by several investigators, such as Schuppius (7) and one of us (8). Rühm (9) and some others believe that it is useful if used as a routine control method. We are of opinion that it might be used in such a way as an "indicator," but for the purposes of public health control it is quite hopeless.

The outcome of the elaboration of methods for estimating the number of cells present in milk has been an attempt to diagnose mastitis amongst the cattle supplying any particular milk. For this reason milk has been examined by many observers for the purpose of ascertaining how many cells are normally present. The discrepancies among the results of the various investigators are to be attributed (1) to the different methods used; (2) to a want of appreciation of the sources of error even in the more refined methods; (3) to the use of isolated milks without reference to circumstances; and (4) to a want of careful inquiry into, and supervision of, the milks employed. The most reliable results are those obtained by Russell and Hoffmann (10) working with cows under strict supervision and over long periods, and these results have been fully confirmed by one of us (8) working under similar conditions. Quite recently Savage (5) has given a large number of results obtained from cows both in health and disease, and though the samples are, in many cases, isolated instances, still the conditions were accurately known. As a result of investigation, the possibility of setting a limit to the number of these cells for the purpose of public health control is seen to be very doubtful. A limit of 500,000 per c.c. seems to be tentatively held by many, though at the same time their own results show that much injustice would be done if such a limit was enforced, both by condemning sound milks and by passing diseased milks. It has been part of this investigation to make weekly enumerations of the cells found in the milk of several herds under careful veterinary inspection, and as a result it has been possible to show that such a limit of 500,000 per c.c. would often condemn milks from quite healthy sources.

The results of Russell and Hoffmann are particularly interesting, in that they attempted to trace the influence of such factors as parturition and lactation, of feeding and temperature, etc., on the number of cells appearing in the milk without being able to detect any definite connection, and we also have arrived at similar conclusions.

Bergey and Savage have both made enumerations of the cells occurring at the same time in the milk from separate quarters of the udder, and they both find very great variations in the numbers so obtained. The importance of this fact in its bearing on the

(7) Schuppius.—"Archiv für Hyg.," Bd. 62, H. 2, S. 137.
(8) Revis—"Jour. Roy. Inst. Pub. Health," Dec., 1908.
(9) Rühm.—"Wochenschrift für Tierheilkunde," 1908, S. 125.
(10) Russell and Hoffmann.—"Jour. of Inf. Diseases," 1907, Sup. 3.

question of the nature of the cells found in milk is great, and does not seem to have been properly appreciated. The same importance attaches to the now well-known fact that cows which have had mastitis in one or more quarters show a large count of cells from those quarters long after the disease has subsided, and lactation has been re-established in the affected quarters.

So long, however, as this method of examination is confined to an enumeration of the cells only, no particular or special importance attaches to their precise nature, but quite recently there has been a tendency to diagnose the presence of "pus" in milk by a "qualitative" examination of the cells present. This has been done by assuming that the cells present are true leucocytes, and making a differential count in a manner similar to that employed in the case of blood. As such attempts have not been merely for scientific interest, but have been used for the hygienic control of existing milk supplies, it becomes of paramount importance to ascertain beyond all doubt whether the nature of these cells justifies their classification as true leucocytes, and consequently their differential enumeration, as in the case of blood. In the course of an investigation into the Bacteriology of Garget, undertaken for the Local Government Board, Savage has made use of a classification into polymorpho-nuclear cells, lymphocytes, large leucocytes, and doubtful cells, but with his usual fairness, on account of discrepancies so found, he clearly states that the presence of any particular form of leucocyte cannot be taken as diagnostic of pus.

Before proceeding, however, to consider the true nature of the cellular elements which come naturally into milk, it will be necessary to consider briefly some of the views which have been held with regard to the formation of milk in the udder, and the general functional activity of that organ. It is necessary clearly to realise the extraordinary secretive power of the udder, the secretion, both in its quantity and complex composition, being without parallel in any other secreting gland of the body.

Attempts have been made to elucidate this from as far back as 1838, when Donné first described the so-called "Colostrum granules," and from that time onward there has been no lack of investigators in this field. Without the least disparagement of the older workers, it is right that we should place more reliance on modern work, on account of the great improvements which have taken place recently in the technique both of preparation of tissues and of staining methods. Particularly is this of importance, as the real solution of the problem lies in the correct microscopical interpretation of sectional preparations of the udder during lactation.

Much confusion in such interpretations has undoubtedly arisen from a want of appreciation of the fact that the whole of the gland tissue is not in the same state of activity at the same time, so that in section we shall expect to find some of the alveoli actively

secreting, while others, having discharged their contents, are for the moment in a "resting" stage. The varying dimensions and form of the epithelial cells during extension of the alveolar space, and during contraction after expulsion of the contents, make it extremely difficult to recognise the cellular elements as the same in both cases.

As it is impossible to mention the views of the host of observers who have contributed to the solution of this problem, we shall briefly quote the excellent summary of such views made by Pfaundler. He distinguishes four typical glandular tissue conditions, which, however, are always closely connected, and are to be taken as occurring in succession in the actively secreting udder.

(*a*) The alveoli are open, the epithelial cells are cubical and containing clear round nuclei with one or two nucleoli. Mitosis is constantly present in the epithelium; the protoplasm of the cells shows fine granulation and vacuoles. The cells appear indefinite, their outline and limiting surfaces indistinct. There is a marked infiltration of the alveoli with leucocytes (many eosinophile), which are found in such great numbers in the interstitial tissue, and the epithelial layer and lumina of the alveoli, that the remaining structure is only recognised with difficulty.

(*b*) The alveoli have very narrow lumina and the epithelium is cubical, the nuclei of which seem shrunken. Mitosis is constantly present. The protoplasm of the cells contains coarse granules and fat drops, and the cell outline is indistinct. The interstitial tissue is rich in leucocytes, but less so than in (*a*). In the lumen of the alveolus leucocytes, colloidal masses and colostrum bodies are present.

(*c*) The alveoli have very narrow lumina and long cylindrical or pyramidal epithelial cells, clearly marked off from one another, some resting flat on the alveolar wall and some suspended by a narrow process. Each cell contains one to three nuclei, and at the free margin of the cell fat drops are often seen. Many of the cells which hang by a tongue of protoplasm into the alveolar space appear as if torn.

(*d*) The alveoli are dilated. The epithelial cells are flat, and in profile appear as ring-shaped narrow protoplasmic borders with spindle-shaped nuclei, and contain very few fat globules. Mitosis is rarely seen.

Particularly characteristic of this state are certain curious forms, first described by Nissen (die Nissenche Körperchen). These bodies consist of nuclei with a characteristic arrangement of chromatin, partly still in the cells and particularly at their distal extremity, and partly in the lumen of the alveolus. The chromatin lies at the periphery of the nucleus in lenticular segmental masses, which ring round the chromatin-free inner nucleoplasm.

It will be noted in this summary that the infiltration of the interstitial tissue with leucocytes, and their extrusion into the lumen of the alveolus, seems to be generally held, but attention is particularly drawn to the pendulous epithelial cells under (*c*), and to the "Nissenche Körperchen," to which reference will again be made.

It is now necessary to consider somewhat in detail the views of Winkler (11). As the result of a careful histological investigation of the udders of cows during different periods of lactation and before parturition, and in cases of mastitis, he describes the general structure of the alveolus as consisting of :—

(*a*) The membrana propria, a structureless envelope and a cuticular formation of the interstitial connective tissue.

(*b*) A muscle fibre layer immediately within this, consisting of smooth muscle cells with very delicate elongated nuclei.

(*c*) The epithelial layer lining the lumen of the alveolus.

In these he is in general agreement with most other observers, but between (*b*) and (*c*) he describes a "germinal cell layer," which seems to have been noticed in 1877 by Kolissnikow, who pronounced it to consist of young epithelial cells, and also by Heidenhain in the submaxillary glands, who also describes it as consisting of small round often multi-nucleated epithelial cells. From this germinal cell layer Winkler shows that the epithelial cells of the gland are constantly renewed, and though normally the cells of the germinal layer lie behind those of the epithelial layer, still in sections (on account, perhaps, of the expansion of the alveolus at the time of taking the tissue from the animal, and the subsequent contraction and distortion brought about by the fixing agent) the germinal cells and epithelial cells often appear to be in the same plane. In epithelial masses found during the colostral period the gradual transformation of these actively multiplying germinal cells into epithelial cells is easily observed. In some cases it would seem that the young germinal cells found in the germinal cell layer develop completely into epithelial cells, though in certain instances a division into an upper and under cell seems to occur, and the upper cell alone becomes an epithelial cell. In the case of the large multi-nucleated germinal cells, and also in young epithelial cells, there is often seen a growing out of one or more of the nuclei, accompanied with little cytoplasm forming a sort of horn which finally becomes separated from the parent cell, and passing through the epithelial layer is pushed out into the lumen of the alveolus. This peculiar action has given rise to appearances in sections which has caused many to mistake this budding process for a wandering of leucocytes into the epithelium. In the extraordinarily marked nuclear multiplication in this germinal layer lies (according to Winkler) the solution of the much investigated question, "How do the epithelial cells multiply ?"

(11) Winkler.—"Zeitschift für Landw Versuchswesen in Oesterrich," 1908, S. 562.

when multi-nucleated cells are seldom found in the epithelium, nor does mitosis often occur during lactation. The nuclei of these multi-nucleated cells are usually small, show no differentiation in their nucleoplasm, and so stain evenly and darkly, but in the developed epithelial cell the nucleoplasm exhibits the chromatin in sectors. The former cells also are more resistant and are not dissolved in the milk secretion, as the epithelial cells often are themselves when detached.

From the time of Rauber onwards the view seems to have been often held that leucocytes and lymphocytes are closely connected with milk formation. Rauber's original view that they are destroyed, and in their destruction are converted into the milk secretion itself, is now discarded, but many hold that during lactation there is a strong infiltration of the interstitial tissue by leucocytes, whence they pass through the epithelial cells and enter the lumen of the alveolus. Winkler, however, maintains that the irregularly situated dark-staining nuclei seen in the epithelium are not those of leucocytes, but are the nuclei of "replacement cells," and this is true also of the early stages of mastitis before the secretion has become watery or bloody. The presence of fat globules in many of the cells found in milk clearly shows that these cells are epithelial, and not leucocytes. In these views he is in accord with Michaelis, who also maintains that leucocytes and lymphocytes play no part in milk formation, and that if they do appear in large numbers it is a proof that suppuration is taking place or injury to the lymphatic vessels has occurred.

We may sum up the views of Winkler and Michaelis briefly by saying that, according to them, "the cells found in normal milk are chiefly young epithelial cells and cells of the germinal layer which have been detached, or thrust out into the lumen of the alveolus and so appear in the milk stream; that over activity of the germinal layer, and consequent increase in the number of these cells, may be the effect of change of food or some disturbance in milk formation, and is not indicative of disease; and, further, that in the early stages of mastitis it is the epithelial layer that is attacked by streptococci, and the destruction of this layer rouses the germinal layer into great activity, with a consequent increase of cells appearing in the secretion, but that no large number of leucocytes and lymphocytes are likely to be found until the mastitis is so far advanced that it shows itself by macroscopic changes in the milk itself, and finally that the multi-nucleated cells found in milk, and usually mistaken for polymorpho-nuclear leucocytes, are really detached young epithelial cells."

With these views we are in complete accord, and on account of the importance now being attached to the presence of multi-nucleated cells in milk, we have considered it advisable to bring

these views forward at once, only appending a general statement of facts now in our possession in support of them, leaving the full statement of these until the work now in hand shall be completed.

This confirmation of Winkler's views has been largely brought about by an improvement in the method of staining these cells, which has enabled us clearly to demonstrate that in general structure, etc., these cells for the most part are clearly not leucocytes. That leucocytes do appear is evident from the fact that by this method of staining the presence of true eosinophile cells is easily demonstrated, but they are very few in number, and the vast majority of the cells tally in every particular with those described by Winkler.

Another important point hitherto apparently quite overlooked is that, in spite of the fact that these cells have often been for a considerable time in a liquid containing many bacteria, and under conditions in which normal leucocytes would retain their activity, phagocytosis is practically never seen, and this is true also when an invasion of the epithelium by streptococci has taken place, and destruction of its cells has followed.

We can briefly sum up those facts which support the view that the cells found in milk are for the most part not leucocytes as follows :—

(1) The vast majority of the cells present in milk (the so-called leucocytes) when critically examined distinctly differ from leucocytes.

(2) However fresh the milk may be, the vast majority of the cells in it never stain like active leucocytes with ordinary blood stains.

(3) While many multi-nucleated cells are present, these are distinctly different from polymorpho-nuclear leucocytes.

(4) The cells present in milk, however fresh, are scarcely ever amœboid.

(5) Ingestion of bacteria by the cells present (phagocytosis) is practically absent.

(6) In milk obtained from perfectly healthy cows these cells may occur in vast numbers, and since the mammary gland in structure resembles other glands, it is against analogy that vast numbers of leucocytes should occur in its secretion.

(7) The cause of the presence of a considerable number of cellular elements at times when there is no obvious reason, such as in quarters of the udder which have a previous history of mastitis, etc., is easily explained if these cells are tissue cells and not leucocytes.

ANALYSES OF CONDENSED MILK.

The following Report on his analyses of a number of samples of condensed milk, both full cream and machine skimmed, was submitted to the September Meeting of the British Dairy Farmers' Association by their Consulting Chemist :—

These twenty samples of condensed milk probably represent nearly every brand commonly sold in this country. The first fact that one notices is that only five of these samples consist of whole milk, all the others being manufactured from separated milk. *i.e.*, milk from which the butter-fat has been separated by machinery, or according to its legal definition " machine skimmed " milk. So far as can be determined, not a single sample has been made in England. The industry is almost entirely Foreign, and, so far as condensed machine-skimmed milk is concerned, would seem to be a means of enabling foreign countries to dump or get rid of their waste product in our markets and at our expense. This state of things would not be possible were it not for the ignorance of the people who use the material, and the failure of the Press to instruct and to warn women against the evil effects which must arise from feeding children on this semi-nutritious substance.

Nearly one-half of the nutriment in these condensed milks consists of sugar, probably cane or beet sugar, which has been added in the course of manufacture. The rest comes from skimmed milk.

The great demand for this material is due to the public considering it a cheap and nutritious food. Let us enquire into these assumptions. Is it a cheap food ? If the prices are compared with the weight of the contents of the tins it will be found that even in the cheapest we only obtain 3·3 ozs. of condensed skimmed milk for one penny. This will contain about 1·6 ozs. of added cane sugar. We may assume that one-half the cost, or ½d., is paid for this sugar. A little calculation will show that at this rate the consumer is buying cane sugar at the price of 5d. a pound, or double its market value.

Let us next consider what is paid for the other constituents. Excepting four of the whole milk samples we find that the others, including all the skimmed milk samples, have been reduced to only one-third of their original bulk or volume. Thus a tin of condensed milk mixed with twice the tin full of water would, apart from the added sugar, bring the material back to skimmed milk. What does this skimmed milk cost the consumer ? Take No. 1 sample as an illustration. We should have 10 ozs. of condensed milk and 20 ozs. of water, in all 30 ozs. If we deduct 1½d. for the added sugar, as above suggested, then the cost of the 30 ozs. of separated milk is 1½d. ; thus the separated milk is paid for at the extravagant rate of 8d. a gallon, or at least four times what it can be bought for in its fresh state. It is evident from the above figures that the popular

notion of condensed milk being a cheap food is quite erroneous. That it appears cheap to many only arises from the fact that instead of diluting it with twice its volume of water, they in their ignorance dilute it with far more, indeed an excessive amount of water, and that not always of the purest, thinking only of quantity and quite oblivious of quality. But infants cannot live on water; consequently they are underfed, puny, irritable, and an easy prey to any and every disease.

But is it a nutritious food? We need not consider here its use in tea or for cooking purposes, but simply its use as a food for infants and children. It will be well to first see what is the average composition of the natural food of infants—woman's milk. The following average analysis is given by König, and by its side I place the composition of No. 1 when diluted to three times its bulk with water:—

Woman's Milk.		No. 1 diluted to three times its bulk.	
Fat	3·78	Fat	0·3
Casein	1·03	Casein	2·55
Albumin (soluble)	1·26	Soluble Albumin	None
Sugar	6·21	Sugar	20·42
Mineral Matter	0·31	Mineral Matter	0·76

It is evident that the marked deficiency of fat will always render separated milk an unsuitable food for children. We must also not overlook the fact that while nature supplies to the infant mainly a soluble albumin requiring practically no digestion, condensed milk supplies only an insoluble albumin, and that often most difficult of digestion. Lastly, every mother knows the effect of cane sugar on her infant, its tendency to produce flatulency and pain. The milk-sugar natural to milk is of a peculiar character not liable to cause this trouble, but in the diluted condensed milk we have three times as much sugar as is required, and only one-fifth of this, at most, consists of milk-sugar. Judged then from the chemical point of view, condensed skimmed milk is evidently at best a very unsuitable substitute for milk, especially for human milk.

There is another aspect of this question. It has generally been assumed, and I had accepted the assumption, that condensed milk was free from bacteria. One of these tins, however, when pierced for opening, immediately showed signs of milk oozing out. It was carefully watched, and then it became evident that the whole of the contents were gradually swelling from the expansion of gas now that the pressure was relieved. Microscopical examination showed the milk to contain numerous bacteria. This caused me to be on the watch for similar samples. Subsequently a second sample was noticed to possess a very disagreeable odour, and this was found to contain bacteria also, though they did not appear to be gas producers. These facts are of importance. It had not occurred to me to make a systematic microscopical examination of each sample. Maybe, if I had done so, others would have been found to contain bacteria.

From enquiries I have made I am informed by users of condensed milk that this oozing out of the contents is a frequent occurrence. We here, then, have a new source of danger to the public health, certainly a new light thrown on the inability of condensed milk to pass as a perfectly safe food. It would thus seem proved that condensed machine-skimmed milk is neither a cheap nor nutritious food, and that it is at best most unsuitable for infants, and may be at times actually a dangerous material to use.

The more I study condensed machine-skimmed milk the more convinced I am that the Legislature ought to insist upon every tin of this substance being marked in large letters, "Unfit for Infants."

FREDK. J. LLOYD, F.I.C.

ANALYSES.

No.	Description	Price	Tin holds	Prepared in	Composition:		Containing:		Sugar	Mineral matter
					Water	Solids	Fat	Casein		
1	Machine Skimmed	3d.	10 ozs.	Holland	27·80	72·20	1·00	7·65	61·25	2·30
2	,,	3d.	7 ,,	,,	29·80	70·20	2·10	8·95	56·55	2·60
3	,,	3d.	8⅓ ,,	Not stated	25·00	75·00	4·18	9·45	68·57	2·80
4	,,	2½d.	7½ ,,	Holland	25·10	74·90	1·30	9·00	61·70	2·90
5	,,	2½d.	7½ ,,	,,	29·60	70·40	2·00	9·30	56·40	2·70
6	,,	2½d.	7⅓ ,,	Saxony	24·60	75·40	1·60	8·30	63·00	2·50
7	,,	2½d.	6½ ,,	Holland	23·70	76·30	1·10	7·50	65·60	2·10
8	,,	2d.	6½ ,,	,,	26·30	73·70	2·10	8·30	63·30	2·50
9	,,	2d.	6 ,,	,,	27·00	73·00	1·80	9·15	59·35	2·70
10	,,	2d.	6½ ,,	Austria	24·10	75·90	1·20	8·95	63·15	2·60
11	,,	1½d.	7 ,,	Holland	22·60	77·40	1·70	10·40	62·10	3·20
12	,,	1½d.	4 ,,	,,	23·80	76·20	1·30	9·00	62·90	3·00
13	,,	1d.	2⅓ ,,	,,	25·70	74·30	2·20	10·00	59·30	2·80
14	Whole Milk	5½d.	11 ,,	Switzerland	26·60	73·40	11·70	8·90	50·10	2·70
15	Full Cream	5d.	11⅓ ,,	Normandy	23·10	76·90	9·70	8·95	55·65	2·60
16	Not Skimmed	4½d.	11 ,,	Norway	24·20	75·80	11·40	9·20	52·60	2·60
17	Full Cream	—	10½ ,,	Not stated	24·10	75·90	12·70	10·00	50·80	2·40
18	Whole Milk	—	4 ,,	Norway	65·90	34·10	11·40	9·10	11·10	2·50
19	Machine Skimmed	1½d.	5½ ,,	Holland	29·50	70·50	1·60	9·90	55·90	3·10
20	,,	1d.	2⅓ ,,	,,	23·30	76·70	1·70	9·60	62·80	2·60

THE NATURAL OCCURRENCE OF BORIC ACID IN MILK.

By S. H. Collins, M.Sc., Lecturer in Agricultural Chemistry, Armstrong College, Newcastle-on-Tyne.

It is more than ten years ago that Jay and Dupasquier pointed out that boric acid was present in many food materials in small amount, and though they did not find any boric acid in milk,[1] quite recently Wiley has found boric acid in women's milk.[2]

Of recent years boric acid has been much used in cattle foods, especially in those cakes made from Indian cotton seed, in which I have found as much as 1 per cent. of boric acid. In other foods, such as linseed cake, decorticated cotton cake, hay and straw, I have often found small amounts of boric acid. Taking these facts into consideration, it seems to me that it is necessary to redetermine whether cows' milk may contain boric acid when the cows are fed upon food containing boric acid.

The following experiments have been carried out at the Durham Dairy Research Station at Offerton Hall, Sunderland, the practical details of feeding the cows and taking the samples of milk being under the direct supervision of Mr. J. McLaren, junior. The analyses have all been carried out at Armstrong College, Newcastle, under my own supervision :—

Two cows were fed on 5 lbs. maize meal, 3 lbs. decorticated cotton cake, and straw chaff and hay throughout the experiment, whilst two other cows were fed the same in all respects except that they received a small quantity of "boric meal" made from 19 parts of maize meal and one part of boric acid, instead of an equal amount of pure maize meal. The boric meal used contained 5 per cent. of boric acid, of which from $\frac{1}{4}$ lb. to 1 lb. were fed. Lot 1 gave about 23 pints of milk per cow per day. Lot 2 gave about 26 pints of milk per cow per day, with fair regularity right through the experiment, independently of the amount of boric acid fed. The boric acid produced no apparent effect on either the cows or the milk.

The milk was tested for fat at irregular intervals, and was found to contain about $3\frac{1}{2}$ per cent. of fat with great regularity.

1 Comptes rendus, 1895, p. 260.

2 Journal of Biological Chemistry, 1907, p. 11.

The following table gives the result of the experiment :—

Date			LOT 1. Boric Meal Fed.	LOT 1. Boric Acid in Milk.	LOT 2. Boric Meal Fed.	LOT 2. Boric Acid in Milk.
			Lb.	Per cent.	Lb.	Per cent.
May 5	..	..	0	0	0	·000
,, 6	..	..	0	0	¼	·001
,, 7	..	..	0	0	½	·002
,, 8	..	..	0	0	¾	·002
,, 9	..	..	0	0	1	·003
,, 10	..	..	0	0	1	·004
,, 11	..	..	0	0	1	·005
,, 12	..	..	0	0	1	·004
,, 13	..	..	0	0	1	·004
,, 14	..	..	0	0	1	·004
,, 15	..	..	0	0	1	·004
,, 16	..	..	0	0	1	·004
,, 17	..	..	0	0·001	1	·004
,, 18	..	..	0	0	½	·003

In the table the "boric meal" contained 5 per cent. of the crystallized boric acid, the amounts quoted being calculated per cow. The percentages of boric acid in the milk also refer to the crystallized acid (H_3BO_4), the corresponding amounts of boric anhydride (B_2O_3) being nearly one half of those given in the table.

It is interesting to note that boric acid appeared in the milk as soon as the cows received a ration containing any boric acid, although there is a slight "lag" in the amounts, since the cows did not reach the maximum amount of boric acid in the milk till three days after receiving the maximum amount of boric acid in the food. The amount of boric acid returned is very small, being only one fiftieth of the amount fed, yet this small amount might be sufficient to render the milk seller liable to prosecution under the Food and Drugs Act. The amount of boric acid fed is by no means excessive, since it is only equal to 5 lbs. of food containing 1 per cent. boric acid, an amount which might be exceeded in practice. Further, it will be seen that by feeding 8 lbs. of food containing only 0·15 per cent. boric acid, the milk would contain 0·001 per cent. boric acid.

Analytical Method.

Ten cc. of milk and 2 cc. of normal soda were evaporated to dryness on the waterbath, ignited, dissolved in 2 cc. treble normal hydrochloric acid, turmeric paper dipped in and dried. A series of standards from 0·0015 per cent. to 0·15 per cent. H_3BO_4 in normal hydrochloric acid were kept, turmeric paper being dipped and dried for comparison tints as required.

The turmeric paper was made specially from a freshly prepared 10 per cent. extract of turmeric in absolute alcohol. The paper deteriorates in the light rapidly.

After the turmeric paper had been dipped and dried it was allowed to rest exposed to air for ten minutes to obtain a uniform degree of moisture. Comparison was made between the red colour in acid and the blue colour in alkaline state.

The following tests were made on milk from cows fed on food free from boric acid :—

Boric Acid Added.	Boric Acid Found.
·0000	·0000
·0020	·0019
·0027	·0032
·0050	·0049
·0091	·0094

Conclusion.

Although a large number of side issues are yet uninvestigated, the main question, "Can boric acid get into milk by feeding cows with food containing boric acid," is answered in the affirmative.

As milk needs $\frac{1}{4}$ per cent. boric acid to produce any useful preservative influence, there seems no difficulty in distinguishing between milk preserved with boric acid and milk contaminated by the use of foods containing boric acid. If a sample of milk contains more than 0·1 per cent. of boric acid, the boric acid has probably been added deliberately ; but if there is less than 0·01 per cent. of boric acid, then feeding is the probable cause. Amounts between 0·1 and 0·01 per cent. do not seem likely to occur in practice.

APPLICATIONS FOR PATENTS FOR DAIRY APPLIANCES, &c.

From January 1st to December 31st, 1909.

No. of Application.	Name of Applicant.	Subject of Invention.
26	Reid, R.	Mouthpiece for teat cups of milking machines.
679	Taylor, G. E.	Milking pails.
1,201	Lawrence, W. H., & Kennedy, R.	Milking machines.
1,711	Ford, T. H.	Preventing theft of milk cans.
2,309	Thomsen, T. F.	Milking machines.
2,778	Marsden, T.	Railway milk cans.
2,890	Manley, E.	Cleansing cream.
3,078	Wawrinsky, T., and others ..	Inflatable tubes for milking machine.
3,259	Cryer, A. D.	Milk can.
3,373	Garner, S. D.	Refrigerator and milk drum.
3,484	Edwards, R. and T.	Milk cans.
4,319	Malkemaskinekompagniet Patent Gandil, Ltd.	Adjusting device for milking machines.
4,923	Portsmouth, A., and another ..	Milk-can hinges, &c.
5,365	Dehne, A.	Milk separators.
5,461	Edmends, T.	Apparatus for teaching milking
7,094	Justice, P. M.	Manufacturing lactic acid.
7,367	Kelly, A. C.	Milk deliverer.
7,391	Armsden, A. R.	Milk cans.
7,634	Varian, W. A.	Milk cans.
7,636	Wiggins, R. A.	Milking machines.
7,736	Moll, F.	Milk-pail cover fastenings.
7,828	Zimmerman, L. J.	Milk delivery in buildings.
8,362	Layland, Layland	Advertising in connection with vending milk.
8,433	Wettervik, K. A. H.	Milking machines.
8,492	Bond, F. T.	Cheese making.
8,845	Gillies, A.	Teat cup.
8,966	Gillies, A.	Teat cup.
9,355	Hamilton, J., and another ..	Milking machines.
9,818	Bathgate, H. N.	Cheese paste.
10,335	Wallace, R.	Milking appliances.
10,349	Wright, T.	Waterproof and dust-proof milk churn.
10,883	Glover, V. J.	Covers for prevention of contamination of milk.
11,177	Sabroe, A.	Milking machines.
12,109	Warlow, W. R.	Milk pails.
12,137	Dunn, J. W.	Cutting butter.
13,223	Dairy Outfit Co., and another ..	Milk-churn tops and lids.
13,601	Schütze, V.	Manufacture of a solid plastic material from curd or casein
13,713	Brown, D. T.	Cheese cutter.
14,194	Bunn, I., and another	Wires for dividing cheese and butter
14,333	Dickin, W.	Cheese vats.
14,979	Grimwade, L. L..	Cream scoop.
14,998	Kunick, G.	Reconstitution of dried milk to liquid state, &c.

APPLICATIONS FOR PATENTS FOR DAIRY APPLIANCES, &c.

From January 1st to December 31st, 1909.

No. of Application.	Name of Applicant.	Subject of Invention.
15,028	Browning, W. E., and another ..	Manufacture of casein.
16,121	Stephens, S. M., and another ..	Machine for churning.
16,548	McLaren, W.	Milk churns.
16,653	Lindström, K. T.	Milking machines.
17,273	Allen, J. E.	Cheese-making apparatus.
17,293	Fellows, Limited, and another ..	Drop handles, as used with milk churns.
18,201	Buer, H. C.	Producing butter flavour or "Aroma."
18,267	Simpson, F. W.	Cheese presses.
18,991	Dennison, W.	Butter churns.
19,183	Henstock, J.	Milking machines.
19,334	Willows, E.	Milk churns.
19,510	Cessna, C. W.	Churning, and blending milk and butter.
19,582	Lawrence and Kennedy.. ..	Milking machines.
20,220	Jonsson, G. E.	Milking machines.
20,687	Sabrof, T. T.	Pulsators for pneumatic milking.
20,731	Cowderoy, J. T.	Milk cans.
21,380	Wareham, E. J.	Cheese cutters.
22,123	Dairy Outfit Co., Ltd., and another	Vessel for storing and selling milk.
22,388	Dairy Outfit Co., Ltd., and another.	Fasteners for milk churns.
22,581	Grayson, T.	Churns.
22,734	Downs, S., and others	Automatic pressure gear for gang cheese presses.
23,127	Bond, F. T.	Utilization of whey for dietetic purposes.
23,281	Davies, J. H.	Teat cups for milking machines.
24,083	Dahl, H.	Milk pails.
24,159	Shakespeare, J.	Railway milk churns.
24,180	Cordeux-Rhys, F.	Apparatus for blending milk and butter, &c.
24,441	Bunn, J.	Wire cutters for cheese, butter, &c.
24,536	Buller, P. H.	Incubating sour milk.
24,717	Portway, H.	Cutting and dividing butter.
25,008	Hodge, C. E., and another ..	Milking machine teat cups.
25,056	Reynolds, F.	Cheese cutter.
25,487	Neilson, A.	Cheese-cutting machine.
26,007	Cabanné, J. P.	Process for fermentation of milk.
26,168	Bond, F. T.	Utilization of whey for dietetic purposes.
26,184	John, G.	Aid to milking.
26,193	Walkey, W. R.	Apparatus for manufacture of Bulgarian soured milk.
26,398	McLarty, F. M.	Separating cream, and churning and testing milk.
27,627	Fenton, R.	Separating cream from milk.

APPLICATIONS FOR PATENTS FOR DAIRY APPLIANCES, &c.

From January 1st to December 31st, 1909.

No. of Application.	Name of Applicant.	Subject of Invention.
27,722	Bond, F. T., and another ..	Utilization of sweet whey for dietetic purposes.
27,723	Bond, F. T., and another ..	Utilization of sour whey for dietetic purposes.
27,764	Cordeux-Rhys, F.	Blending milk and butter.
27,772	Blake, R. A.	Locking-hook, upon which milk vendors may hang their milk tins.
28,204	Lawrence and Kennedy.. ..	Milking machines.
28,607	Ahlborn, K. A.	Milking machines.
28,648	Blake, R. A.	Locking-pin for use with milk tins, &c.
28,691	Milne, J.	Sieving milk.
29,167	Threlfall, J.	Receptacles for use in the delivery of milk.

British Dairy Farmers' Association.

EXAMINATION FOR BUTTER-MAKING AND CHEESE-MAKING CERTIFICATES AT THE COUNTY DAIRY SCHOOL, CHELMSFORD, ON MONDAY, TUESDAY, AND WEDNESDAY, JUNE 14TH, 15TH, AND 16TH, 1909.

EXAMINERS: Mr. J. F. BLACKSHAW and Mr. F. J. LLOYD, F.C.S.

Two hours are allotted to Candidates for Cheese-making or Butter-making Certificates; and three hours to Candidates for both Butter and Cheese-making Certificates.

Candidates will be examined *viva voce*. Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are requested to make their answers as brief as possible—brief and accurate. Each answer should be written on a separate sheet of paper, and subsequently the sheets should be fastened together in order in the left-hand corner.

Candidates are required to answer the following questions:—

FOR BUTTER-MAKING CERTIFICATE .. .. Nos. 1 to 8, inclusive.

FOR CHEESE-MAKING CERTIFICATE .. .. Nos. 1 to 4 and 9 to 12, inclusive.

QUESTIONS.

1. Given 100 gallons of milk containing 3·7 % of fat, show by figures the amount of butter it ought to yield, and what would be the loss of fat.

2. On what lines would you judge the merits of a cream separator?

3. In preparing tainted milk for butter or cheese-making what can be done (*a*) when the taint is due to feed, and (*b*) when due to bacteria?

4. What are enzymes, and what part do they play in dairying?

5. What are the advantages you secure by ripening cream for butter-making?

6. Do you prefer thick or thin cream, and why?

7. Contrast the advantages of brine salting of butter with those of dry salting.

8. What are the chief causes of butter not keeping ?

9. Where Cheddar cheese is made from two meals milk, fully describe the treatment of the night's milk, stating the reason for each step taken.

10. Why is salt used in the making of cheese ; how does it act ; and under what circumstances would you use more or less salt ?

11. How should cheese be housed and treated during the ripening period ? Give your reasons.

12. Show by figures the kind of cheese likely to yield the greatest money value returns for the milk used, taking the present market prices as the basis of your calculations.

EXAMINATION FOR CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON THURSDAY, FRIDAY, AND SATURDAY, JUNE 3RD, 4TH, AND 5TH, 1909.

EXAMINERS: Mr. C. W. WALKER-TISDALE, Mr. W. J. GIBBONS, and Mr. F. J. LLOYD, F.C.S.

Two hours are allotted to Candidates for Cheese-making, Butter-making, or Elementary Teachers' Certificates; and three hours to Candidates for both Butter and Cheese-making Certificates.

Candidates will also be examined *viva voce*. Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are requested to make their answers as brief as possible—brief and accurate. Each answer should be written on a separate sheet of paper, and subsequently the sheets should be fastened together in order in the left-hand corner.

Candidates are required to answer the following questions :—

FOR BUTTER-MAKING OR ELEMENTARY TEACHERS' CERTIFICATE	Nos. 1 to 8, inclusive.
FOR CHEESE-MAKING CERTIFICATE	Nos. 1 to 4 and 9 to 12, inclusive.

QUESTIONS.

1. Give the average composition of milk, mention the conditions which affect this composition, and explain why.

2. State briefly what systems of testing milk should be employed—
   (*a*) Where milk is sold.
   (*b*) Where used for butter-making.
   (*c*) Where used for cheese-making.
3. Describe the ripening of cream, and state briefly its advantages.
4. State the chief sources of bacterial taints in milk, in summer and in winter.
5. Compare any two characteristic separators, explaining how each works, and pointing out their relative merits.
6. What amount of fat is lost in butter-making, and where?
7. If you were going to dry salt butter, would you use brine first or not? Give your reasons.
8. State how you would compare several samples of butter to determine their relative merits, and how in doing so you would recognise any faults in their manufacture.
9. How long would you stir and set before breaking the curd, and if you would vary this, state under what conditions.
10. What is the cause of a soft curd? State the best treatment in breaking the same.
11. Supposing the milk showed 0·3 per cent. of acid, how would you proceed to turn same into a good cheese?
12. Why is so much ill-flavoured cheese made? What are the main causes?

EXAMINATION FOR DIPLOMA AND CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING; ON THURSDAY, FRIDAY, AND SATURDAY, SEPTEMBER 9TH, 10TH, AND 11TH, 1909.

EXAMINERS: MR. W. J. GRANT, MR. HENRY CANNON, and MR. F. J. LLOYD, F.C.S.

Two hours are allotted to Candidates for Cheese-making, Butter-making, or Elementary Teachers' Certificates; and three hours to Candidates for Dairy Teachers' Certificates, or both Butter and Cheese-making Certificates.

The written part of the Examination for the Diploma will be divided into two parts: the first three hours being devoted to the 15 questions contained on this sheet. After an interval of an hour-and-a-half, Diploma Candidates will be allowed a further two hours to answer additional questions.

Candidates will also be examined *viva voce*. Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are requested to make their answers as brief as possible—brief and accurate. Each answer should be written on a separate sheet of paper, and subsequently the sheets should be fastened together in order in the left-hand corner.

Candidates are required to answer the following questions :—

For Butter-making or Elementary Teachers' Certificate	Nos. 1 to 8, inclusive.
For Cheese-making Certificate	Nos. 1 to 4 and 9 to 12, inclusive.
For Dairy Teachers' Certificate or Diploma	Nos. 1 to 15, inclusive.
For Diploma	Second paper (as above stated.)

QUESTIONS.

1. Describe the process of milk secretion, and state how the fluctuations in the composition of milk depend thereon.

2. Compare the average composition of milk with that of colostrum.

3. What methods of obtaining cream are feasible in this country ?

4. How would you prepare a starter—
   (*a*) With a pure culture ?
   (*b*) Without a pure culture ?

5. Under what conditions would you churn whole milk, and how would you prepare the milk for churning ?

6. Enumerate the advantages derived by ripening the cream, and state opposite each why it is obtained.

7. What proportion of water would you desire in butter—(*a*) in summer ; (*b*) in winter ?

8. Assuming butter when made to be free from taint, on what factors will its keeping qualities mainly depend ?

9. In making cheese from a dairy of 50 cows how would you manage the evening's milk ? Give reasons for your answer.

10. What acidity would you like in the curd before salting ? Would you vary the acidity in spring, summer, and autumn ?

11. State a few of the most important taints in milk and cheese, and how these may be counteracted.

12. What are the main causes of a loss of butter-fat (*a*) in the whey ; (*b*) from the ripening cheese ?

13. State how you would demonstrate to a class the composition and nature of the constituents of milk.

14. Describe the lactic acid bacillus as seen—

    (*a*) From a pure culture ;
    (*b*) Growing in milk ;
    (*c*) Growing in Petri dish ;
    (*d*) Growing on gelatine slope.

    State its characteristic appearance in each case.

15. What record would you advise being kept in a dairy (*a*) where milk is sold ; (*b*) where made into butter ; (*c*) where made into cheese.

Second Paper for DIPLOMA Candidates.

Two hours allowed.

QUESTIONS.

16. What conditions would guide you to a choice of breed of dairy cattle ?

17. State what form of dairying is most exhaustive to the land, and explain the reason.

18. What plants and grasses would you expect to find in permanent pasture on which dairy cattle are grazed ? State in three columns—good, bad, and indifferent.

19. What nitrogenous manures are most serviceable on a dairy farm ?

20. What capital would be necessary to stock and equip a Butter dairy of 60 cows ? How would you utilize by-products ?

21. What methods are most economical for calf-rearing ?

EXAMINATION RESULTS, 1909.

EXAMINATION FOR BUTTER-MAKING AND CHEESE-MAKING CERTIFICATES AT THE COUNTY DAIRY SCHOOL, CHELMSFORD, ON MONDAY, TUESDAY, AND WEDNESDAY, JUNE 14TH, 15TH, AND 16TH, 1909.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Philip R. Horrobin, Miss Gertrude M. Garrard, Miss Constance Poulter, John Hodge, Reginald S. Breiant, Miss Kathleen E. Quenby, and Walter F. E. Woodnutt.

A Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making to Miss Gertrude M. Garrard, Miss Constance Poulter, John Hodge, and Miss Kathleen E. Quenby.

EXAMINATION FOR BUTTER-MAKING AND CHEESE-MAKING CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON THURSDAY, FRIDAY, AND SATURDAY, JUNE 3RD, 4TH, AND 5TH, 1909.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Miss Mary Williams, Walter P. Dowdall, George N. Wall, Miss Lily Orsborn, Miss Myfi Evans, Miss Hettie Thomas, Miss Ethel Edgar, John G. Underwood, Miss Monica N. Lyne, Miss Timotee Lichauco, Robert Paterson, and Miss Grace H. Edenborough.

A Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making to Miss Rachel A. Davies, Miss Mary Williams, Walter P. Dowdall, George N. Wall, Miss Lily Orsborn, Miss Myfi Evans, and Miss Hettie Thomas.

EXAMINATION FOR DIPLOMAS AND CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON THURSDAY, FRIDAY, AND SATURDAY, SEPTEMBER 9TH, 10TH, AND 11TH, 1909.

A Diploma and Silver Medal for Proficiency in the Science and Practice of Dairying and Dairy Farming to Miss Madeline Mason, Miss Dinah M. Evans, and Miss M. P. Comer.

A Teacher's Certificate for Proficiency in the Science and Practice of Dairying to Robert B. Curwen.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making and Cheese-making to Miss Helen M. Williams, Miss Winifred James, and Miss Annie James.

A Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making to Miss Ethel Edgar.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Bernard Dowdall, Miss Emmie H. Lewis, Miss Ethel G. Davies, and Harold T. Elwes.

EXAMINATIONS FOR CERTIFICATES AND DIPLOMAS.

The Association grants to any Candidate, male or female, who satisfactorily passes the necessary Examinations :—

(*a*) **A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making.** Entry Fee, 5s.

(*b*) **A Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making.** Entry Fee, 5s.

(*c*) **A Teacher's Certificate for Proficiency in the Science and Practice of Dairying.** Entry Fee, 10s.

(*d*) **A Diploma and Silver Medal for Proficiency in the Science and Practice of Dairying and Dairy Farming.** Entry Fee, 10s.

The Examinations, which will extend over two or more days, will test (firstly) the Theoretical Knowledge of the Candidates, (secondly) their Practical Skill in Butter-making or Cheese-making, or both. Each Competitor will be required to answer, in writing, a set of questions within a given time, and will also be examined *viva voce*. The Practical Examinations will take place on the same or on the following day, at a suitable Dairy.

Candidates for the Butter-making Certificates must produce satisfactory evidence that they have received at least three months' instruction (not necessarily at a Dairy School) in the Theory and Practice of Butter-making. They must possess an elementary knowledge of Chemistry and Bacteriology so far as they relate to the use of Milk, Cream, and Butter, and a fair knowledge of Sections 1, 2, 3, and 5 of the following syllabus. They will be required to make Butter.

Candidates for the Cheese-making Certificate must produce satisfactory evidence that they have received at least six months' instruction (not necessarily at a Dairy School) in the Theory and Practice of Cheese-making. They must possess an elementary knowledge of Chemistry and Bacteriology so far as they relate to Milk and Cheese, and also a fair knowledge of Sections 1, 4, and 5 of the following syllabus. They must have full knowledge of the production of one variety of Hard Cheese, also a general knowledge of the manufacture of other varieties of hard cheese, and of soft cheeses. They will be required to make at least one British Cheese of not less than 25lbs. weight (or Stilton, 10lbs.).

NOTE.—Candidates who pass in practical work only at the Butter and Cheese-making Examinations will not be required to again make Butter and Cheese at similar Examinations for which they may subsequently enter.

Candidates for a Teacher's Certificate must have been well trained, and will be required to make Butter and Cheese, and produce satisfactory evidence that they have received not less than twelve months' instruction at a Scientific Training Centre.

They will be expected to possess a detailed and precise knowledge of Sections 1 to 5 of the Syllabus, to understand the General Management and Feeding of Dairy Cattle, and to give evidence of their ability to Teach and Elucidate the Elementary Principles and Practice of Dairying.

Candidates for the Diploma must produce satisfactory evidence that they have received not less than one year's scientific and practical instruction at some recognised Centre for Dairying Instruction, and have spent at least twelve months on a Farm.

They will be required to make Butter and Cheese. They will be expected to possess a detailed and precise knowledge of all the Sections of the Syllabus, an elementary knowledge of Chemistry and Bacteriology in its relation to Soils

Manures, Foods, and Dairy Produce; Botany, in its relation to Farm Plants; and Physiology and Veterinary Science in their relation to the Feeding and Treatment of Farm Stock in Health and Disease.

NOTE.—Candidates who have previously satisfied the Examiners in practical butter and cheese-making at a Diploma or Teacher's Examination will be excused practical work at subsequent Teacher's Certificate and Diploma Examinations for which they may enter.

Candidates are at liberty to bring their own utensils for the Practical Examination if they wish to do so.

Candidates are only eligible to be awarded the particular Certificate for which they enter.

Examinations for the Butter-making and Cheese-making Certificates will be held twice a year, viz., in the Spring and Autumn; and the Examinations for the Teachers' Certificates and Diplomas in the Autumn only.

SYLLABUS.

1. Milk.—The Yield of Milk from various breeds; the Production of Milk; Milking; Composition of Milk; Fluctuations in Yield and Quality, with their causes; the Nature and Properties of the Constituents of Milk: the Chemical Analysis of Milk; the Microscopical and Bacteriological Examination of Milk; Colostrum; Methods of Utilizing, Preserving, and Distributing Milk; Taints in Milk, their causes and cure.
2. Cream.—The Various Methods of Obtaining Cream; the Construction and Use of the Utensils employed—Separators; the Composition of Cream; the Analysis of Cream; the Ripening of Cream; the Chemical and Bacteriological Changes in Cream; the Preparation of Cream for Market; the Preparation of Cream for Butter-making; the Utilization of Separated or Skim-milk.
3. Butter.—The Various Methods of Obtaining Butter; the Utensils employed and the Principles involved; Conditions which affect the Butter Yield; Butter-milk; the Composition and Properties of Good Butter; Faults in Butter-making; the Chemical and Bacteriological Examination of Butter.
4. Cheese.—Rennet; the Action of Rennet on Milk; the Scientific Principles of Cheese-making and Cheese-ripening; the Chemistry and Bacteriology of Cheese; the Composition of Cheese and of the Bye-products of its Manufacture; the Detailed Principles and Practice for the Manufacture of One Variety of Hard Cheese; the General Practice of Manufacture of other Hard, and of Soft Cheeses; the Composition and Utilization of Whey; the Manufacture of Whey Butter.
5. The Keeping of Dairy Records, and the General Book-keeping of a Dairy.
6. Dairy Farming.—Its Principles and Practice, with the Management of the Dairy Farm; Implements and Machinery; Manures; Crops; Stock and Finances.
7. Crops and Feeding Stuffs. — The Cultivation, Manuring, Sowing, Reaping, and Harvesting of Farm Crops; their Composition and Utilization. Artificial Feeding Stuffs—their Production, Composition, and Utilization.
8. Live Stock.—The Varieties; Peculiarities; Breeding, Rearing, and Management of the Live Stock of a Farm.
9. Book-keeping of a Dairy Farm.

EXAMINATIONS AT LOCAL CENTRES.

In order to meet the convenience of pupils at Dairy Schools, members of local Societies, and other persons, the Association will conduct Examinations for its Diplomas and Certificates at any place in the United Kingdom upon receiving satisfactory proof that the following conditions will be observed:—

That the School, Society, County Council, or other body requesting such an Examination to be held, undertake to supply all necessary appliances and materials, and pay the fees and expenses of the Examiners. The milk supplied must be free from preservatives and fit for cheese-making.

In all cases two Examiners will be appointed. An additional Examiner may be required in the Examination for Diplomas.

Elementary Teacher's Certificate of Competency in Dairy Work.

The Association also grants to any Candidate who can satisfactorily pass the necessary Examinations:—

AN ELEMENTARY TEACHER'S CERTIFICATE FOR PROFICIENCY IN THE THEORY AND PRACTICE OF BUTTER-MAKING.

Such Certificates (as well as the Association's ordinary Certificates) will be accepted by the Right Honourable the Lords of the Committee of the Privy Council on Education for the purposes of Article 101 *(i)* of the Education Code, 1893, and Article 13 *(e)* of the Evening Continuation Schools Code Candidates, who must have undergone practical instruction in Butter-making for at least twenty days, will be required to show their practical skill in Butter-making, and to satisfactorily answer in writing, within a given time, a set of questions on the following subjects:—

1. Milk.—Its Production, Composition, and Properties. Methods of Testing, Preserving, Distributing, etc. The Utilization of Skim Milk.
2. Cream.—Its Production, Composition, and Properties.
3. Butter.—Its Production, Composition, and Properties.

Candidates will also be examined *vivâ voce.*

The Elementary Teacher's Certificates are in the following form:—

This is to certify that ________________ has attended the Dairy School Classes of the ________________________
at ________________ for a period of * ________________
viz., from ________________ to ________________
and has during the whole of that period undergone practical instruction in Butter-making; that ____________ has received some instruction in the Theory of Butter-making, and has written a paper on the subject, displaying an intelligent knowledge thereof; and that ____________ is consequently qualified to give instruction in the practice of Butter-making to children in Public Elementary Schools.

* Not less than 20 days.

Particulars and Entry Forms may be obtained of

The SECRETARY,

BRITISH DAIRY FARMERS' ASSOCIATION,

12, Hanover Square, London, W.

ANNUAL REPORT OF THE CONSULTING CHEMIST.

Mr. F. J. Lloyd, F.C.S., F.I.C.

During the past year there has been a slight increase in the number of samples sent to me, the total number being 126, as compared with 116 in 1908. In addition, I have analysed 20 samples of condensed milk, the report on which has already been presented to the Council, and will be found reproduced in this Journal on page 183, and 273 samples of milk were analysed in connection with the Dairy Show. Thus the total number of samples analysed during the year amounted to 419.

The samples sent by members may be classified as follows:—

Milk	89
Cream	18
Butter	4
Cheese	1
Water	1
Soil	1
Feeding Stuffs	6
Manures	4
Miscellaneous	2
	126

The samples of milk were mainly sent for ordinary analysis, though in a certain number I was also requested to make a microscopical examination for tubercle bacilli, and I am pleased to state that in no single instance was I able to discover the tubercle bacillus in a sample.

I am inclined to think that the climatic conditions which prevailed in 1909 will have proved detrimental to the resistance of those people who are liable to consumption; in other words, that the statistics which will be available later on will show an increase of consumption in this country. If I am right in my forecast, I am certainly right in suggesting that this increase of disease will be attributed to the fact of the Milk Bill having been dropped by the Government owing to the antagonistic attitude of the farmers, and that as a result there has been diminished care on the part of dairy farmers to keep the milk free from tubercle bacilli. Personally, I have all along maintained that there is scarcely any relation between the prevalence of consumption in man and the presence of tubercle bacilli in milk, but I am almost alone in this view, and, therefore, I would urge the farmers to be particularly careful to ensure the cleanliness of the milk supply, for sooner or later a Milk Bill must and ought to be introduced, and a definite attempt made by Parliament to diminish the prevalence of tuberculosis in cattle.

In most of the samples of cream which have been sent to me I have been asked to determine the percentage of boric acid.

Preservatives.—The question of the use of preservatives both in cream and other dairy products is one which is still in a most unsatisfactory state. An important contribution to the question has been made during the past year by Dr. J. M. Hamill in a report to the Local Government Board. Dr. Hamill considers that in the case of cream "the maximum amount of boron preservative calculated as boric acid should be 0·4 per cent. from May to October and 0·25 per cent. during the remainder of the year." I do not think that the data supplied by Dr. Hamill justify his assumption that ·4 per cent. boric acid will be sufficient in potted cream during the summer months, and according to my experiments and experience less than 0·5 per cent. will not be sufficient, especially in very hot weather. The whole question of the use of preservatives is in a most unsatisfactory state, and I do not think it will ever be satisfactorily solved until some competent Board of Referees is appointed by the Government to fix from time to time all standards relating to food.

The other samples submitted to me call for very little remark. I cannot help being surprised that from a Society numbering about 1,000 members, the majority of whom must utilise both feeding stuffs and manures, so small a number should take the trouble to have the substances which they purchase tested. My experience as an Analyst teaches me that farmers not only frequently pay far too high a price for the articles they purchase, but that these substances are very often far from being what they ought to be.

I hope that in the coming year the members of the Association will make greater use of the chemical privileges which their membership affords them.

Unchurnable Cream.—Of the two miscellaneous samples, one was a sample of unchurnable cream. Both this year and in former years I have from time to time been consulted because of cream which would not churn. The cause of this unchurnability has never yet been properly investigated. I am carrying out some experiments. It is to be hoped that the Development Act will provide some method of assisting scientific men in an investigation of this description. The individual farmer who suffers for the moment can scarcely be expected to bear the cost of such an investigation, and a scientific man who carries the investigation out has to spend his time and his means in an attempt to obtain information which can be of no use to himself. If successful, he gives his results to the world solely for the benefit of others. It is in my opinion this unsatisfactory state of affairs which causes so little original research to be undertaken in England.

REPORT OF CONSULTING BOTANIST.

Professor JOHN PERCIVAL.

In August an inquiry was received from a member of the Association regarding the poisonous quality of milk from a cow which was assumed to have eaten some deleterious herbage. The cow, a pure Shorthorn, kept specially for the household milk supply, was found to be feverish, and giving milk of a slightly reddish tinge. Two of the member's children and a companion were violently sick after consuming the milk, and the medical man called in concluded that the trouble was due to poisonous material derived from some plant which the cow had eaten.

Yarrow, which was tolerably abundant in the field, was suspected at first, but this plant is not known to possess poisonous qualities, and is freely eaten by all kinds of farm stock.

Bitter Sweet or Woody Night Shade (Solanum Dulcamara), a well-known representative of a poisonous family of plants, was found in considerable amount in the hedges, and suspicion rested upon this. Unfortunately, I was not able to examine the cow or the milk, and the matter therefore remains somewhat obscure and undecided.

Very little is known, with certainty, of the effect of the consumption of poisonous plants upon the properties of milk, and cases of this kind are of exceptional interest and importance. I hope that members will take the opportunity of reporting similar instances as soon as they occur, so that they may be thoroughly investigated.

AWARD OF PRIZES, DAIRY SHOW, 1909.

COWS AND HEIFERS IN MILK.

Class 1—Shorthorn Cows.—Entered in or eligible for Coates' Herd Book, or its pedigree sent for such entry previous to the Show.—*First* Inspection Prize (£10) to C. R. W. Adeane, Babraham Hall, Cambridge, for "Heather Queen 3rd." *Second* Inspection Prize (£5) to Lord Rothschild, Tring Park, Herts., for "Dorothy." *Third* Inspection Prize (£3) to Mrs. A. G. F. Thornton, Kingsthorpe Hall, Northampton, for "Ring." *First* Milking Trial Prize (£20) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Lady Heggle." *Second* Milking Trial Prize (£10) to Lord Rothschild for "Darlington Cranford 5th." *Third* Milking Trial Prize (£5) to the Duke of Portland, K.G., Welbeck Abbey, Worksop, for "Darlington Cranford 6th."

Class 2—Shorthorn Cows.—Not eligible for Class 1.—*First* Inspection Prize (£10) to J. F. Spencer, Hornsey Lane Farm, Highgate, for "Merry Maid." *Second* Inspection Prize (£5) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Buttercup." *Third* Inspection Prize (£3) to Sam S. Raingill, The Grange, Ringway, Altrincham, for "Sunflower." *First* Milking Trial Prize (£20) to J. L. Shirley, Silverton, Bletchley, for "Daisie." *Second* Milking Trial Prize (£10) to J. L. Shirley, for "Mamie." *Third* Milking Trial Prize (£5) to Samuel Sanday, Puddington Hall, near Chester, for "Raspberry."

Class 3—Lincolnshire Red Shorthorn Cows.—Entered in or eligible for the Herd Book of the Lincolnshire Red Shorthorn Association.—*First* Inspection Prize (£10) to John Evens, Burton, near Lincoln, for "Burton Quality 5th." *Second* Inspection Prize (£5) and *Second* Milking Trial Prize (£10) to John Evens for "Burton Spotted 5th." *Third* Inspection Prize (£3) to John Evens for "Burton Ruby 12th." *First* Milking Trial Prize (£20), The "Barham" Challenge Cup, The Lord Mayor's Champion Cup, to John Evens for "Burton Nancy 5th."

Class 4—Shorthorn Heifers, not exceeding three years.—Entered in or eligible for Coates' Herd Book.—*First* Inspection Prize (£5) to Lord Rothschild, Tring Park, Herts., for "Ivy." *Second* Inspection Prize (£3) and *First* Milking Trial Prize (£7) to George Taylor, Cranford Hounslow, for "Rugia Niblett." *Third* Inspection Prize (£2) to Robt. W. Hobbs and Sons, Kelmscott, Lechlade, Glos., for "Frosty 16th." *Second* Milking Trial Prize (£4) to C. R. W. Adeane, Babraham Hall, Cambridge for "Babraham Lorna." *Third* Milking Trial Prize (£2) to C. R. W. Adeane for "Babraham Doreen."

Class 5—Shorthorn Heifers, not exceeding three years.—Not eligible for Class 4.—*First* Inspection Prize (£5) and *Third* Milking Trial Prize (£2) to F. J. Stanhope, Alma House, Claybrooke, Rugby, for "Red Rose." *Second* Inspection Prize (£3) and *Second* Milking Trial Prize (£4) to John Evens, Burton, near Lincoln, for "Burton Pride 5th." *Third* Inspection Prize (£2) to J. L. Shirley, Silverton, Bletchley, for "Mercia 3rd." *First* Milking Trial Prize (£7) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Maggie."

Class 6—Jersey Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to A. Miller-Hallett, Goddington, Chelsfield, Kent, for "Vanilla 2nd." *Second* Inspection Prize (£4) to R. Bruce Ward,

Westwood, Droitwich, for "Mrs. Viola." *Third* Inspection Prize (£2), *Second* Milking Trial Prize (£10), and the "Blythwood" Challenge Bowl, to J. H. Smith-Barry, Stowell Park, Pewsey, Wilts., for "Post Obit." *First* Milking Trial Prize (£15) to J. H. Smith-Barry for "Marigold." *Third* Milking Trial Prize (£5) to the Lady de Rothschild, Aston Clinton, Tring, for "Mary." *Extra Third* Milking Trial Prize (£5) to R. Bruce Ward, Westwood, Droitwich, for "Lovely Venus."

Class 7—Jersey Heifers, not exceeding three years.—Bred in Great Britain or Ireland.—Entered in or eligible for the Herd Book.—*First* Prize (£7) to J. H. Smith-Barry, Stowell Park, Pewsey, Wilts., for "New Year's Gift." *Second* Prize (£4) to J. H. Smith-Barry. *Third* Prize (£2) to W. M. Cazalet, Fairlawn, Tonbridge, for "Orphan."

Class 8—Jersey Heifers, not exceeding three years.—Bred in the Channel Islands.—Entered in or eligible for the Jersey or English Jersey Herd Book.—*First* Prize (£7) to Wm. Alexander, Les Marais, St. Mary's, Jersey, for "Les Marais Fern." *Second* Prize (£4) to Wm. Alexander, for "Rustique 6th." *Third* Prize (£2) to Fowler and De La Perrelle, Southampton, for "Nestor's Dora."

Class 9—Guernsey Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to Sir E. A. Hambro, Hayes Place, Hayes, Kent, for "Golden Cherry." *Second* Prize (£4) to Sir E. A. Hambro, for "Hayes Express."

Class 10—(Cancelled).

Class 11—Red Polled Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to Kenneth M. Clark, Sudbourne Hall, Orford, Suffolk, for "Sudbourne Belle Dotty 1st." *Second* Inspection Prize (£4) and *First* Milking Trial Prize (£15) to the Earl of Radnor, Longford Castle, Salisbury, for "Mona." *Third* Inspection Prize (£2) to Kenneth M. Clark for "Sudbourne Abigail 2nd." *Second* Milking Trial Prize (£10) to Kenneth M. Clark for "Sudbourne Queen 1st."

Class 12—Red Polled Heifers.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£5) and *Second* Milking Trial Prize (£3) to Kenneth M. Clark, Sudbourne Hall, Orford, Suffolk, for "Sudbourne Molly." *Second* Inspection Prize (£3) to Alfred J. Smith, Rendlesham, Woodbridge, for "Rendlesham Favour." *Third* Inspection Prize (£2) to Kenneth M. Clark for "Sudbourne Rosie." *First* Milking Trial Prize (£5) to A. Carlyle Smith for "Ashmoor Molly." *Third* Milking Trial Prize (£2) to A. Carlyle Smith for "Ashmoor Jewiss."

Class 13—(Cancelled).

Class 14—South Devon Cows.—*First* Inspection Prize (£7), *First* Milking Trial Prize (£15), and The "Spencer" Challenge Cup, to W. and H. Whitley, Primley Farm, Paignton, Devon, for "Fancy." *Second* Milking Trial Prize (£10) to Wm. P. Vosper, Merafield, Plympton, for "Ladybird 3rd."

Class 15—Kerry Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to Muriel, Countess de la Warr, Old Lodge, Nutley, Sussex, for "Buckhurst Peaceful." *First* Milking Trial Prize, (Cup value £5, offered by the English Kerry and Dexter Cattle Society) to Muriel, Countess de la Warr, for "Buckhurst (Waterville) Saffhire."

Class 16—Dexter Cows.—No entry.

Class 17—Pair of Cows of any Breed or Cross (in Milk).—*First* Prize (£20) to A. Stansfield, Calliards Farm, Smithy Bridge, Rochdale, for

"Mona the 1st" and "Mona the 2nd." *Second* Prize (£15) to Tom Hunter, Dolphinlee Farm, Lancaster, for "Nellie" and "Jenny." *Third* Prize (£10) to Jas. Sheppy, Redlynch Park, Chewton Keynsham, near Bristol, for "Mary" and "Red Rose" (Shorthorns). *Fourth* Prize (£5) to John Evens, Burton, near Lincoln, for "Burton Ruby Spot 2nd" and "Burton Bramblefinch" (Lincoln Red Shorthorns). *Fifth* Prize (£3) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Dot" and "Pet."

Class 18—Single Cow of any Breed or Cross (in Milk).—*First* Prize (£7) to Sam. S. Raingill, The Grange, Ringway, Altrincham, for "Marguerite." *Second* Prize (£5) to F. J. Stanhope, Alma House, Claybrooke, Rugby, for "Graceful." *Third* Prize (£4) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Mary." *Fourth* Prize (£3) to John Evens, Burton, near Lincoln, for "Burton Fanny." *Fifth* Prize (£2) to Tom Hunter, Dolphinlee Farm, Lancaster for "Polly."

BUTTER TESTS.

Shorthorns.—Entered in Classes 1, 2, 3, 4, and 5.—*First* Prize (£5 and Silver Medal) to John Evens, Burton, near Lincoln, for "Burton Nancy 5th." *Second* Prize (£2 and Bronze Medal) to Samuel Sanday, Puddington Hall, near Chester, for "Raspberry."

Jerseys.—Entered in Classes 6, 7, and 8, and eligible for the English Jersey Herd Book.—*First* Prize (Gold Medal or £10) to J. H. Smith-Barry, Stowell Park, Pewsey, Wilts., for "Marigold." *Second* Prize (Silver Medal and £5) to the Lady de Rothschild, Aston Clinton, Tring, for "Mary." *Third* Prize (Bronze Medal and £3) to David Mutton, Triangle Jersey Farm, Plumpton, Lewes, Sussex, for "Primrose Planet." Butter Prize (£1) to Jersey de Knoop, Calveley Hall, Tarporley, Cheshire, for "Muscotah."

Any Other Breed.—Entered in Classes 9 to 16 inclusive.—Prize (£3) to Wm. P. Vosper, Merafield, Plympton, for "Ladybird 3rd" (South Devon).

BULLS.

Class 19—Shorthorn Bull, twelve months old or over.—Entered in or eligible for the Herd Book.—*First* Prize (£10) to Robert W. Hobbs and Sons, Kelmscott, Lechlade, Glos., for "Village Swell 8th."

Class 20—Jersey Bull, above one year and not exceeding three years.—Entered in or eligible for the Herd Book.—*First* Prize (£10) to the Lady de Rothschild, Aston Clinton, Bucks., for "Fairy King." *Second* Prize (£5) to O. F. Mosley, The Old Club Dairy, Melton Mowbray, for "Satan."

Class 21—Bull of any other Pure Breed, twelve months old or over.—Entered in or eligible for the Herd Book.—Silver Medal to W. & H. Whitley, Primley Farm, Paignton, Devon, for "Primley Baron (South Devon).

BREEDERS' PRIZES.

Silver Medal to each First Prize Cow, Heifer, or Bull in the Show.—To Mrs. Nicholson, for "Heather Queen 3rd," No. 2; John Evens, for "Burton Quality 5th," No. 52; T. Hunter, for "Ivy," No. 60; J. A. Boselet, for "Vanilla," No. 87; J. H. Smith-Barry, for "New Year's Gift," No. 132; G. F. Poole, for "Les Marais Fern," No. 137; Kenneth M. Clark, for "Sudbourne Belle Dotty 1st," No. 167; Kenneth M. Clark,

for "Sudbourne Molly," No. 177: T. Willing, for "Fancy," No. 183, W. H. Mullens, for "Buckhurst Peaceful," No. 187; W. H. Rowland, for "Burton Nancy 5th," No. 54; J. H. Smith-Barry, for "Marigold," No. 114; Wm. P. Vosper, for "Lady Bird 3rd," No. 186; Robert W. Hobbs & Sons, for "Village Swell 8th," No. 222; Lady de Rothschild, for "Fairy King," No. 230; W. & H. Whitley, for "Primley Baron," No. 232.

SHE-GOATS.

Class 22—Milking Class for Goats (any variety).—*First* Prize (Silver Medal and £2 10s.), the British Goat Society's Challenge Cup, and the Baroness Burdett-Coutts' Challenge Cup, to Mrs. J. C. Straker, The Leazes, Hexham, for "Leazes Eve." *Second* Prize (£1 10s.) to Lady Gertrude Crawford, Coxhill, Lymington, Hants, for "Killerton Opal." *Third* Prize (£1) to George Walker, Honeymead, Wendover, Bucks, for "Crab."

Class 23—Goats of any Variety that have won one or more First Prizes in Classes other than for Kids or Goatlings on or before September 6th, 1909.—*First* Prize (£2) to Mrs. J. C. Straker, The Leazes, Hexham, for "Leazes Eve." *Second* Prize (£1) to Mrs. M. E. B. Handley Spicer, The Glen, Kingsbury, N.W., for "Copthorne Plum."

Class 24—Toggenburg or other Swiss Pure Breeds.—Not eligible for Class 23.—*First* Prize (£2) to Mrs. M. E. B. Handley Spicer, The Glen, Kingsbury, N.W., for "Sedgemere Cravate." *Second* Prize (£1) to Mrs. M. E. B. Handley Spicer for "Copthorne Medler." *Third* Prize (10s.) to Mrs. E. G. Barnett, Halton, Corbridge-on-Tyne, for "Sedgemere Cassandra."

Class 25—Horned She-Goats.—Not eligible for Classes 23 or 24; over two years on October 1st, 1909.—*First* Prize (£2) to W. A. Wilcox, Tally-Ho Lodge, Basingstoke, for "Bricket Chubby." *Second* Prize (£1) to Lady Arthur Cecil, The Mount, Lymington, Hants., for "Bricket Belladonna." *Third* Prize (10s.) to Miss E. N. Pope, Glendalyn, New Milton, Hants., for "Broxbourne Blond."

Class 26—Hornless She-Goats.—Not eligible for Classes 23 or 24; over two years on October 1st, 1909.—*First* Prize (£2) to Mrs. M. E. B. Handley Spicer, The Glen, Kingsbury, N.W., for "Copthorne Pollen." *Second* Prize (£1) to Herbert E. Hughes, The Bungalow, Broxbourne, Herts., for "Broxbourne Venus." *Third* Prize (10s.) to Miss E. N. Pope, Glendalyn, New Milton, Hants., for "Broxbourne Dorothy."

Class 27—Goatlings (any variety), over twelve months and not over two years on October 1st, 1909.—*First* Prize (£2) to Mrs. M. E. B. Handley Spicer, The Glen, Kingsbury, N.W., for "Copthorne Cherry." *Second* Prize (£1) to Miss Elsie Mortimer, Wigmore, Holmwood, Surrey, for "Bricket Tawdry." *Third* Prize (10s.) to Miss Maude Wilde, Little Gaddesden, Berkhamsted, for "Bricket Lady Bird."

Class 28—Female Kids (any variety), not exceeding twelve months of age on October 1st, 1909.—*First* Prize (£2) to W. A. Wilcox, Tally-Ho Lodge, Basingstoke, for "Tally-Ho Theodora." *Second* Prize (£1) to Mrs. M. E. B. Handley Spicer, The Glen, Kingsbury, N.W., for "Copthorne Blackberry." *Third* Prize (10s.) to Miss E. N. Pope, Glendalyn, New Milton, Hants., for "Grace."

Cheese (for Makers only, residing in any part of the United Kingdom).

Class 29—Cheddar (4 Cheeses).—*First* Prize (£10) and The Lord Mayor's Champion Cup to Cary and Portch, Redlynch Park Farm, Bruton, Somerset. *Second* Prize (£7) to G. D. Templeman, Hambridge, Curry

Rivel, Taunton. *Third* Prize (£5) to Robert Stevenson, Boghead, Galston, Ayrshire. *Fourth* Prize (£3) and *Fifth* Prize (£2) to E. Brake, Discove Dairy, Bruton, Somerset.

Class 30—Cheddar (20 Cheeses).—*First* Prize (Silver Medal and £10) to Cary and Portch, Redlynch Park Farm, Bruton, Somerset. *Second* Prize (£7) to Robert Stevenson, Boghead, Galston, Ayrshire. *Third* Prize (£5) to G. D. Templeman, Hambridge, Curry Rivel, Taunton. *Fourth* Prize (£3) to J. S. C. Burfitt, Bakers' Farm, Chorlton Horethorne, Sherborne, Dorset. *Fifth* Prize (£2) to Robert Stevenson.

Class 31—Cheddar Truckles (8 Cheeses).—*First* Prize (£3) to William Hunter, Garthland Mains, Stranraer, N.B. *Second* Prize (£2) to Francis Osborne, Catsley, Corscombe, Dorset. *Third* Prize (£1) to Alexander Cross, Knockdon Farm, Maybole, Ayrshire.

Class 32—Cheshire (4 Coloured Cheeses, not less than 40 lbs. each).—*First* Prize (£10) to John Baguley, Aston Manor Farm, Newport, Salop. *Second* Prize (£5) to Frederick Dale, Frith Farm, Wrenbury, Nantwich. *Third* Prize (£2) to John Craddock, Ebnal Hall, Malpas, Cheshire.

Class 33—Cheshire (4 Uncoloured Cheeses, not less than 40 lbs. each).—*First* Prize (£10) to John Craddock, Ebnal Hall, Malpas, Cheshire. *Second* Prize (£5) to John Williams, Hollin Green Sound, Nantwich, Cheshire. *Third* Prize (£2) to Thomas Emberton, Birch Hall, Ellesmere, Shropshire.

Class 34—Cheshire (20 Cheeses).—*First* Prize (Silver Medal and £10) to W. H. Hobson, Gonsley, Blakenhall, Nantwich. *Second* Prize (£5) to Charles E. Parton, Houghton Hall Farm, Tarporley. *Third* Prize (£3) to John Baguley, Aston Manor Farm, Newport, Salop. *Fourth* Prize (£2) to Thomas Emberton, Birch Hall, Ellesmere, Shropshire.

Class 35—Stilton (8 Cheeses).—*First* Prize (£10) to Henry Morris, Manor Farm, Saxelbye, Melton Mowbray. *Second* Prize (£5) to James C. Wilford, Old Manor House Farm, Long Clawson. *Third* Prize (£2) to Belvoir Vale Dairies, Harby, Melton Mowbray.

Class 36—Stilton (36 Cheeses).—*First* Prize (Silver Medal and £8) to Tuxford and Nephews, Melton Mowbray. *Second* Prize (£4) to Henry Morris, Manor Farm, Saxelbye, Melton Mowbray. *Third* Prize (£2) to Belvoir Vale Dairies, Harby, Melton Mowbray.

Class 37—Wensleydale (Stilton-shaped or Flat, 8 Cheeses).—*First* Prize (£5) to Alfred Rowntree, Kirkby Overblow, Pannal, S.O. *Second* Prize (£3) to Joseph Carter, Low Applegarth, Richmond, Yorks. *Third* Prize (£2) to Alfred Rowntree.

Class 38—Lancashire (4 Cheeses).—*First* Prize (£5) to Lawrence Bailey, Bryars Farm, Lea, near Preston. *Second* Prize (£3) to Geo. B. Nelson, Cockerham Hall, near Garstang. *Third* Prize (£2) to James Fisher, Gardner's Farm, Goosnargh, near Preston.

Class 39—Double Gloster (4 Cheeses, from 26 lbs. to 30 lbs. each, total weight not to exceed 120 lbs.)—*First* Prize (£5) to Miss E. M. Lewis, King's Hill, Berkeley, Gloucestershire. *Second* Prize (£3) to George T. Powell, Crardless, Berkeley, Gloucestershire. *Third* Prize (£2) to Mrs. C. A. Goodwin, Aston Hill Farm, Stone, Staffs.

Class 40—Single Gloster (4 Cheeses, from 13 lbs. to 15 lbs. each, total weight not to exceed 60 lbs.).—*First* Prize (£3) to George Prout, Standish

Court Farm, near Stonehouse, Glos. *Second* Prize (£2) to Thos. J. S. Davis, Hinton Farm, Berkeley, Glos. *Third* Prize (£1) to C. Harris and Son, Rectory Farm, Slimbridge, Stonehouse, Glos.

Class 41—LEICESTER (4 Cheeses).—*First* Prize (£3) to Joseph Rigby, South Croxton, Leicester. *Second* Prize (£2) to Miss A. M. E. Bowmer, The Hays, Barrow-on-Soar, Leicestershire. *Third* Prize (£1) to Warwickshire County Council, Griff House, Nuneaton.

Class 42—DERBY (4 Uncoloured Cheeses, not less than 25 lbs. each).—*First* Prize (£3) to Yoxall and District Co-operative Dairy Society, Ltd., Yoxall, Burton-on-Trent. *Second* Prize (£2) to P. Swain, Wem, Salop. *Third* Prize (£1) to Yoxall and District Co-operative Dairy Society, Ltd.

Class 43—CAERPHILLY (4 Cheeses, not exceeding 8 lbs. each).—*First* Prize (£3) to Miss M. Thomas, Llwymnendy Farm, Llandilo, Carmarthen. *Second* Prize (£2) to Wilts. United Dairies, Ltd., Devizes. *Third* Prize (£1) to Edward Dibble, Brean, near Burnham, Somerset.

Class 44—CREAM CHEESE (made from pure Cream only; no milk or curd to be added; 6 Cheeses).—*Two Equal First* Prizes (£1 each) to Charles Prideaux, Dairy Farm, Motcombe, Dorset, and Mid-Sussex Dairy Co., Ltd., Sheffield Park Station, Lewes, Sussex. *Two Equal Second* Prizes (10s. each) to Mrs. E. Dickson Park, Sedgmoor, Loudwater, Bucks., and W. Chatterton, Haynes Farm Dairy, Alexandra Place, Bedford.

Class 45—GERVAIS (6 Cheeses).—*First* Prize (£1) and *Second* Prize (10s.) to Wilts. United Dairies, Ltd., Devizes.

Class 46—UNRIPENED SOFT CHEESE (other than Cream Cheese or Gervais made direct from milk; 4 Cheeses).—*First* Prize (£1) to Albert Ricketts, Cosy Nook, Billericay, Essex. *Second* Prize (10s.) to Albert Ricketts. *Third* Prize (7s. 6d.) to O. D. Carter, 23, Church Street, Ilfracombe.

Class 47—RIPENED SOFT CHEESE (other than Cream Cheese or Gervais, made direct from milk; 4 Cheeses).—No award.

COLLECTIONS OF DAIRY PRODUCE.

Class 48—COLLECTION OF BRITISH DAIRY PRODUCE.—*First* Prize (Gold Medal) to Aplin and Barrett and the Western Counties Creameries, Ltd., Yeovil.

Class 49—COLLECTION OF COLONIAL DAIRY PRODUCE.—No entry.

BACON.

Class 50—SMOKED (Four Sides).—*First* Prize (Silver Medal) to Cornish Meat and Provision Co., Bacon Factory, Redruth, Cornwall. *Second* Prize (Bronze Medal) to Charles Prideaux, Dairy Farm, Motcombe, Dorset.

Class 51—UNSMOKED (Four Sides).—*First* Prize (Silver Medal) to Cornish Meat and Provision Co., Bacon Factory, Redruth, Cornwall. *Second* Prize (Bronze Medal) to Charles Prideaux, Dairy Farm, Motcombe, Dorset.

HAMS.

Class 52—SMOKED (Four Hams).—*First* Prize (Silver Medal) to Palethorpes, Ltd., Dudley Port, Staffs. *Second* Prize (Bronze Medal) to Palethorpes, Ltd.

Class 53—Unsmoked (under 14 lbs. : four Hams).—*First* Prize (Silver Medal) to Joseph Smith, Cummersdale, near Carlisle. *Second* Prize (Bronze Medal) to S. Ward, Ltd., 222, Broad Street, Birmingham.

Class 54—Unsmoked (over 14 lbs. ; four Hams).—*First* Prize (Silver Medal) to Joseph Smith, Cummersdale, Carlisle. *Second* Prize (Bronze Medal) to Joseph Smith.

Class 55—Selling Class for Hams, any variety (two Hams).—*First* Prize (£2) to Joseph Smith, Cummersdale, near Carlisle. *Second* Prize (£1) to Joseph Smith. *Third* Prize (10s.) to Joseph Smith.

BUTTER.

Class 56—Butter (perfectly free from salt, the produce of Channel Islands Cattle and their Crosses; 2 lbs. in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. G. B. Robinson, Poole House Farm, Nantwich; Mrs. Frank Ward, Burnville, Tavistock; Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon. *Three Equal Second* Prizes (£2 each) to Roland Underwood, Wards Coombe, Great Berkhamsted; Miss E. A. Peek, Quarry Farm, Whitchurch, Tavistock; Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Third* Prizes (£1 each) to Alfred Palmer, Wokefield Park, Mortimer, Berks.; Miss E. G. Everest, Chippens Bank, Hever, Kent.; Viscount Portman, Bryanston, Blandford.

Class 57—Butter (slightly salted, the produce of Channel Islands Cattle and their Crosses; 2 lbs. in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. G. B. Robinson, Poole House Farm, Nantwich; Mrs. E. Dickson Park, Sedgemoor, Loudwater, Bucks.; Miss M. A. Dalrymple, Elliston, St. Boswells, N.B. *Three Equal Second* Prizes (£2 each) to Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon; Mrs. Crawford, Cox House Farm, Norton-on-Tees, Durham; Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Third* Prizes (£1 each) to Roland Underwood, Wards Coombe, Great Berkhamsted; Henry P. Sturgis, Givons, Leatherhead, Surrey; Mrs. C. M. McIntosh, Havering Park, Romford, Essex.

Class 58—Butter (perfectly free from salt, the produce of Shorthorn and other Cattle and their Crosses, except Channel Islands and their Crosses; 2 lbs. in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon; Mrs. A. Ferguson, Old Town, Southwaite, Carlisle; Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Second* Prizes (£2 each) to Mrs. Frank Ward, Burnville, Tavistock; Hon. A. Holland-Hibbert, Munden, Watford; Miss M. A. Dalrymple, Elliston, St. Boswells, N.B. *Three Equal Third* Prizes (£1 each) to Miss E. Masson, The Dairy Cottage, Floors Castle, Kelso, N.B.; Mrs. A. A. Bere, Stoodleigh Barton, near Tiverton, Devon; Sir G. A. Cooper, Bart., Hursley Park, Winchester.

Class 59—Butter (slightly salted, the produce of Shorthorn and other Cattle and their Crosses, except Channel Islands and their Crosses; 2 lbs. in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon; Miss M. A. Dalrymple, Elliston, St. Boswells, N.B.; Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Second* Prizes (£2 each) to Mrs. Frank Ward, Burnville, Tavistock; Mrs. G. B. Robinson, Poole House Farm, Nantwich; Mrs. B. Matterson, Housenrigg, Brayton, R.S.O., Cumberland. *Three Equal Third* Prizes (£1 each)

to Mrs. E. Harrison, Anchor Farm, Blubberhouses, Otley; Mrs. A. Ferguson, Old Town, Southwaite, Carlisle; Miss A. Dodd, Exwick, Barton, Exeter.

Class 60—BUTTER (slightly salted; 2 lbs. in 1 lb. lumps).—*First* Prize (£3) to Mrs. Maurice Bullock, Bodieve, Wadebridge, Cornwall. *Second* Prize (£2) to Miss Emily Lewis, Pontantwn Farm, Pontantwn, Kidwelly, S. Wales. *Third* Prize (£1) to Mrs. G. B. Robinson, Poole House Farm, Nantwich.

Class 61—BUTTER (free from salt, or slightly salted, at the discretion of the Exhibitor; to be made from Scalded Cream only; 2 lbs. in 1 lb. lumps). —*First Prize* (£3) to Mrs. Maurice Bullock, Bodieve, Wadebridge, Cornwall. *Second* Prize (£2) to Mrs. Frank Ward, Burnville, Tavistock. *Third* Prize (£1) to Miss M. A. Dalrymple, Elliston, St. Boswells, N.B.

Class 62—FRESH BUTTER (free from salt; in 24 lb. boxes of 12 rolls. Packages (non-returnable) to be taken into consideration. The rolls not to be separately wrapped).—*First* Prize (£5) to Piltown Co-operative Dairy Society, Ltd., Piltown, Co. Kilkenny. *Second* Prize (£3) to Drumholm Co-operative Agricultural and Dairy Society, Ltd., Bridgetown, Co. Donegal. *Third* Prize (£2) to Granagh Co-operative Dairy Society, Ltd., Ballingarry, Co. Limerick. *Fourth* Prize (£1) to Charles Prideaux, Dairy Farm, Motcombe, Dorset. *Fifth* Prize (10s.) to Ballymote Co-operative Agricultural and Dairy Society, Ltd., Ballymote, Co. Sligo.

Class 63—MILD CURED BUTTER (in boxes of 24 rolls of 1 lb. each, slightly salted. Packages (non-returnable) to be taken into consideration).—*First* Prize (£5) to Drumholm Co-operative Agricultural and Dairy Society, Ltd., Bridgtown, Co. Donegal. *Second* Prize (£3) to Aghadowey Co-operative Agricultural and Dairy Society, Ltd., Drumcroon, Coleraine. *Third* Prize (£2) to Belleek Co-operative Dairy Society, Ltd., Belleek, Co. Fermanagh. *Fourth* Prize (£1) to Ballymote Co-operative Agricultural and Dairy Society, Ltd., Ballymote, Co. Sligo. *Fifth* Prize (10s.) to Pomeroy Co-operative Agricultural and Dairy Society, Ltd., Pomeroy, Co. Tyrone.

Class 64—CURED BUTTER (not less than 28 lbs., slightly salted. Packages (non-returnable) to be taken into consideration).—*First* Prize (£5) to Tamnaskenny Co-operative Agricultural and Dairy Society, Ltd., Cookstown, Co. Tyrone. *Second* Prize (£3) to Springfield Co-operative Agricultural and Dairy Society, Ltd., Enniskillen, Co. Fermanagh. *Third* Prize (£2) to West Marton Dairy Co., West Marton, Skipton-in-Craven, Yorks. *Fourth* Prize (£1) to Piltown Co-operative Dairy Society, Ltd., Piltown, Co. Kilkenny. *Fifth* Prize (10s.) to Belleek Co-operative Dairy Society, Ltd., Belleek, Co. Fermanagh.

Class 65—CURED BUTTER (56 lbs, packages (non-returnable) to be taken into consideration).—*First* Prize (£5) to Charles Prideaux, Dairy Farm, Motcombe, Dorset. *Second* Prize (£3) to Cavan Central Co-operative Agricultural and Dairy Society, Ltd., Ballyhaise, Co. Cavan. *Third* Prize (£2) to Newcastle West Co-operative Dairy Society, Newcastle West, Co. Limerick. *Fourth* Prize (£1) to Lissau Demesne Creamery, Cookstown, Co. Tyrone. *Fifth* Prize (10s.) to Moneymore Co-operative Agricultural and Dairy Society, Ltd., Moneymore, Co. Londonderry.

Class 66—FANCY OR ORNAMENTAL DESIGN IN BUTTER, with foliage or other extraneous decoration.—*First* Prize (£3) to Mrs. M. M. Giddings, Erchfont, Devizes. *Second* Prize (£2) to Miss Nellie Bennion, Daisy Bank, Barthomley, near Crewe, Cheshire. *Third* Prize (£1) to Miss H. M. Trenchard, Uphay Farm, Axminster, Devon.

Class 67—Fancy or Ornamental Design in Butter, without extraneous decoration, adapted for table use.—*First* Prize (£3) to Mrs. Crawford, Cox House Farm, Norton-on-Tees, Durham. *Second* Prize (£2) to Mrs. H. M. Trenchard, Uphay Farm, Axminster, Devon. *Third* Prize (£1) to Mrs. J. Gooderham, Dairy Farm, North Lopham, Thetford.

COLONIAL BUTTER.

Class 68—Salt Butter (one box, containing not less than 56 lbs.).—*First* Prize (Silver Medal and £5) to Queensland Farmers' Co-operative Co., Ltd., Grantham Butter Factory, Queensland, Australia. *Second* Prize (Bronze Medal and £3) to Downs Co-operative Dairy Co., Ltd., Toowoomba, Queensland. *Third* Prize (£2) to Newstead Co-operative Butter Factory, Newstead, Victoria, Australia.

Class 69—Fresh Butter (one box, containing not less than 56 lbs.).—*First* Prize (Silver Medal and £5) to Marburg Butter Factory, Queensland. *Second* Prize (Bronze Medal and £3) to Onkaparinga Cheese and Butter Factory Co., Woodside, South Australia. *Third* Prize (£2) to Warwick Butter and Dairying Co., Allora Factory, Queensland.

CREAM.

Class 70—Clotted Cream (in vessels ready for sale; not less than 2 lbs. nor more than 3 lbs., in one or more vessels).—*First* Prize (Silver Medal) to J. Pepperall, Belle Vue Dairy, Sidmouth. *Second* Prize (Bronze Medal) to Mrs. A. Morrison, Fonthill House, Tisbury, Wilts.

Class 71—Cream, other than clotted, (in vessels ready for sale: not less than 2 lbs. or more than 3 lbs., in one or more vessels).—*First* Prize (Silver Medal) to Miss E. Masson, The Dairy Cottage, Floors Castle, Kelso, N.B. *Second* Prize (Bronze Medal) to Thomas French, Crystal Palace Dairy, Upper Norwood.

SKIM-MILK BREAD AND SCONES—(Mixed with Skim-milk in lieu of Water).

Class 72—White Bread (2 loaves, not exceeding 2 lbs. each).—*First* Prize (Silver Medal) to William Collier, 2, High Street, Leigh, Lancs. *Second* Prize (Bronze Medal) to G. R. Partridge, 137, High Street, Merstham, Surrey.

Class 73—Brown Bread (2 loaves, not exceeding 2 lbs. each).—*First* Prize (Silver Medal) to Lancashire Cash Bakery Co., Ltd., South Shore, Blackpool. *Second* Prize (Bronze Medal) to W. F. Callow, 43, High Street, Staines.

Class 74—Fancy Bread (not exceeding 4 lbs.).—*First* Prize (Silver Medal) to W. F. Callow, 43, High Street, Staines. *Second* Prize (Bronze Medal) to F. J. Paine, 375, Lordship Lane, East Dulwich.

Class 75—Home-made Bread (2 loaves, not exceeding 2 lbs. each).—*First* Prize (Silver Medal) to Mrs. E. Lloyd, 24, Melville Street, Great Lever, Bolton. *Second* Prize (Bronze Medal) to Miss Bessie Wearing, 167, Morris Green Lane, Bolton.

Class 76—Twelve Scones, baked on Girdle or Plate, any shape, not exceeding 6 ozs. each, without fruit.—*First* Prize (Silver Medal) to Kurtz Bros., 200, Lower Clapton Road, Clapton. *Second* Prize (Bronze Medal) to F. J. Paine, 375, Lordship Lane, East Dulwich.

HONEY, &c.

Class 77—Twelve Jars of Light-coloured Extracted Honey (1 lb. each approximate weight).—*First* Prize (£1) to R. W. Lloyd, 8, Norwich Road, Thetford, Norfolk. *Second* Prize (15s.) to R. Morgan, The Apiary, Cowbridge, Glamorganshire. *Third* Prize (12s. 6d.) to H. W. Saunders, 43, Croxton Road, Thetford, Norfolk. *Fourth* Prize (10s.) to T. G. Hillier, Hurstbourne Tarrant, Andover.

Class 78—Twelve Jars of Medium-coloured Extracted Honey, other than Heather Honey, (1 lb. each approximate weight).—*First* Prize (£1) to R. H. Bayne, 51, Bridge Street, Cambridge. *Second* Prize (15s.) to E. C. R. White, Newton Toney, near Salisbury. *Third* Prize (12s. 6d.) to F. W. Frusher, Swiss Apiary, Crowland, Peterborough. *Fourth* Prize (10s.) to James Lee & Son, Ltd., 4, Martineau Road, Highbury, London, N.

Class 79—Twelve Jars of Dark-coloured Extracted Honey, including any variety of Heather mixture (1 lb. each approximate weight).—*First* Prize (15s.) to John T. Willson, York Villas, Shirebrook, near Mansfield. *Second* Prize (10s.) to James Pearman, Penny Long Lane, Derby.

Class 80—Twelve Jars of Run (Ling, Caluna Vulgaris) Heather Honey (1 lb. each approximate weight).—*First* Prize (15s.) to James Pearman, Penny Long Lane, Derby.

Class 81—Twelve Jars of Granulated Honey of 1908, or any previous year (1 lb. each approximate weight).—*First* Prize (£1) to John T. Willson, York Villas, Shirebrook, near Mansfield. *Second* Prize (10s.) to F. W. Frusher, Swiss Apiary, Crowland, Peterborough.

Class 82—Twelve Sections of Honey, other than Heather (size 4¼ by 4¼; 1 lb. each approximate weight).—*First* Prize (£1) to R. H. Bayne, 51, Bridge Street, Cambridge. *Second* Prize (15s.) to James Pearman, Penny Long Lane, Derby.

Class 83—Six Sections of Heather Honey (1 lb. each approximate weight).—*First* Prize (£1) to James Pearman, Penny Long Lane, Derby. *Second* Prize (15s.) to William Dixon, 27, Central Road, Kirkgate, Leeds.

Class 84—Display of Comb and Extracted Honey, of any year (approximately 100 lbs. in weight, shown on a space of 3 feet by 3 feet).—*First* Prize (£2) to Mrs. Turner, Broadway, Amersham. *Second* Prize (£1 5s.) to R. H. Bayne, 51, Bridge Street, Cambridge. *Third* Prize (15s.) to James Lee & Son, Ltd., 4, Martineau Road, Highbury.

Class 85—Wax (not less than 2 lbs., in 2 cakes only; the Produce of the Exhibitor's Apiary; extracted and cleaned by the Exhibitor or his assistants).—*First* Prize (15s.) to Alfred Hiscock, Loddington, Kettering, Northants. *Second* Prize (10s.) to E. C. R. White, Newton Toney, near Salisbury.

Class 86—Wax (not less than 3 lbs.; the Produce of the Exhibitor's Apiary; extracted and cleaned by the Exhibitor or his Assistants; to be shown in shape, quality, and package suitable for the retail trade).—*First* Prize (15s.) to F. Harris, High Ferry, Sibsey, near Boston, Lincs. *Second* Prize (10s.) to James Pearman, Penny Long Lane, Derby.

Class 87—Interesting and Instructive Exhibit of a Practical or Scientific Nature, connected with Bee Culture, not mentioned in the foregoing Classes.—*First* Prize (15s.) to James Lee & Son, Ltd., 4, Martineau Road, Highbury, London, N.

ROOTS, &c.

Class 88—Six Specimens of Long Mangolds, drawn from a crop of not less than two acres.—*First* Prize (£3) to P. Le Feuvre, Morvelle House, St. Ouen's, Jersey. *Second* Prize (£2) to Thomas Simpson, Bucklow Hill Farm, Plumbley, Knutsford. *Third* Prize (£1) to Abraham Gregory, Heath Croft Farm, Saighton, Chester.

Class 89—Six Specimens of Globe Mangolds, drawn from a crop of not less than two acres.—*First* Prize (£3) to T. Bowden, Junr., Tyne Farm, Sherborne St. John, Basingstoke. *Second* Prize (£2) to P. Le Feuvre, Morvelle House, St. Ouen's, Jersey. *Third* Prize (£1) to Charles Tough, Bell Farm, Eton Wick, near Windsor.

Class 90—Six Specimens of Golden or Crimson Tankard Mangolds, drawn from a crop of not less than two acres.—*First* Prize (£3) to Ernest F. Bellamy, The Moat, Newent, Glos. *Second* Prize (£2) to P. Le Feuvre, Morvelle House, St. Ouen's, Jersey. *Third* Prize (£1) to H. Dent-Brocklehurst, Almsbury Farm, Winchcombe, Glos.

Class 91—Six Specimens of Intermediate Mangolds, drawn from a crop of not less than two acres.—*First* Prize (£3) to Thomas Simpson, Bucklow Hill Farm, Plumbley, Knutsford. *Second* Prize (£2) to William Lewis, Junr., Coddington Mills, near Chester. *Third* Prize (£1) to Ernest F. Bellamy, The Moat, Newent, Glos.

Class 92—Six Specimens of Swede, any variety, drawn from a crop of not less than two acres.—*First* Prize (£3) to W. Watts, Sheep Court, Bonvilstone, Cardiff. *Second* Prize (£2) to Harry How, Corner Farm, Hemel Hempstead, Herts. *Third* Prize (£1) to Henry Bulford, Water Eaton, Oxford.

Class 93—Collection of Roots, &c., for Cattle Feeding in Winter.—To consist of Six Specimens of as many as possible of the following: Mangolds, Swedes, Turnips, White Carrots, Red Carrots, Potatoes, Beetroot, Kohl-Rabi, Parsnips, and Cabbages.—*First* Prize (£5) to Lady Wantage, Lockinge House, Wantage. *Second* Prize (£3) to Mrs. C. M. McIntosh, Havering Park, Romford. *Third* Prize (£2) to P. E. Mead, Gubblecott Farm, Tring.

INVENTIONS, &c.

Class 94—Railway Milk Churns, dust-proof, suitable for the conveyance of Milk, capable of containing from 12 to 17 Imperial Gallons.—*First* Prize (£10 10s.) and Second Prize (£5 5s.), offered by the Lord Mayor, equally divided between Vipan & Headly, Leicester, and Abbott, Field & Co., Ltd., 106, York Road, Lambeth, S.E.

Class 95—Any New Invention relating to the Dairy Industry, or one showing distinct and practical improvement, not eligible for competition in any other Class, and not previously exhibited at the Dairy Show. *Prizes*—The Judges are empowered to award a Silver or Bronze Medal for any Exhibit showing sufficient merit. The Judges shall have the right to submit any exhibit to a practical test, or to call upon the Exhibitor to make such test in their presence, before making an award.—*Silver* Medal to the Dairy Supply Co., Ltd., Museum Street, W.C., for New Model "Alfa Laval" Cream Separator, A5, separating 440 gallons per hour. *Silver* Medal to The Engineering and Foundry Co., Hermitage Street, Crewkerne, Somerset, for Submerged Cream Coil, with a minimum of joints. *Silver* Medal to The Automatic Dairy Appliances, Ltd., Twickenham, for "Tubex" Automatic Pasteurising Plant. *Bronze* Medal to Matthews & Potter, 10, Grove Road, Eastbourne, for The

"Eastbourne" Bottle Filler. *Bronze* Medal to The Dairy Outfit Co., Ltd., 251-5, Pentonville Road, King's Cross, for One Dozen Milk Cans, cone shape, for retail delivery. *Bronze* Medal to The Dairy Supply Co., Ltd., for Sorensen's Moisture in Butter Tester. *Bronze* Medal to Thomas Bradford & Co., 141-142, High Holborn, W.C., for Improved Patent Lid Fastener for "Diaphragm" and "End-und-End" Churns. *Bronze* Medal to Perfect Dairy Machines, Ltd., 103, Middle Abbey Street, Dublin, for "Milk Cooler." *Bronze* Medal to Perfect Dairy Machines, Ltd., for "Cheese Fat Tester."

BUTTER-MAKING CONTESTS.

Class 96—Open to those who have never won a prize at any Show, wherever held.—*First* Prize (£3) to Miss E. Treasure, Tiled House Farm, Oxlynch, Stonehouse, Glos. *Second* Prize (£2) to Miss Kitty Harris, Munster Institute, Cork. *Third* Prize (£1) to Miss Kathleen Murphy, Munster Institute, Cork.

Class 97—Open to Students who have attended at the British Dairy Institute, Reading, for not less than one month during the past two years.—*First* Prize (£3) to Miss J. James, Blaen Baglan Dairy, Aberavon, S. Wales. *Second* Prize (£2) to Miss Ethel Edgar, Old Place, East Tisted, Alton. *Third* Prize (£1) to Miss H. M. Trenchard, Uphay Farm, Axminster, Devon.

Class 98—Open to Men and Women.—Section A.—*First* Prize (£3) to Miss Edith M. Herbert, Huntsham Court, Symond's Yat, Ross-on-Wye. *Second* Prize (£2) to Mrs. N. Comer, Fanshaws Farm, Hertford. *Third* Prize (£1) to Miss M. P. Comer, Fanshaws Farm, Hertford.

Class 98—Section B.—*First* Prize (£3) to Miss K. Murphy, Munster Institute, Cork. *Second* Prize (£2) to Miss A. Prichard, Village Farm, Upper Warren, Bromsgrove. *Third* Prize (£1) to Miss Nellie Evans, Court Farm, Butleigh, Glastonbury, Somerset.

Class 98—Section C.—*First* Prize (£3) to Miss Lily Lutey, Penwarne, Mevagissy, Cornwall. *Second* Prize (£2) to Miss E. M. Powell, Ballingham Court, Holme Lacy, Hereford. *Third* Prize (£1) to Miss R. James, Great Llancayo, Usk, Mon.

Class 98—Section D.—*First* Prize (£3) to Miss E. M. A. Chadderton, Upper Heamies, Eccleshall, Staffs. *Second* Prize (£2) to Miss Jefferies, Burlington, Shifnal, Salop. *Third* Prize (£1) to Miss C. Webb, The Home Farm, Savernake Forest, near Marlborough, Wilts.

Class 99—Open to First Prize Dairy Show Winners of 1909.—*First* Prize (£3) to Miss Edith M. Herbert, Huntsham Court, Symond's Yat, Ross-on-Wye. *Second* Prize (£2) to Miss Lily Lutey, Penwarne, Mevagissy, Cornwall. *Third* Prize (£1) to Miss E. Treasure, Tiled House Farm, Oxlynch, Stonehouse, Glos.

Class 100—Champion Contest.—Open to winners of First Prizes in the preceding Classes, or at the Dairy Show of 1908. Champions of any year excepted.—*First* Prize (Lord Mayor's Champion Cup and £5) to Miss E. M. A. Chadderton, Upper Heamies, Eccleshall, Staffs. *Second* Prize (£3) to Miss K. Murphy, Munster Institute, Cork. *Third* Prize (£2) to Miss Edith M. Herbert, Huntsham Court, Symond's Yat, Ross-on-Wye.

Class 101—Open to Members of the Dairy Students' Union.—*First* Prize (Silver Medal offered by the Dairy Students' Union, and Challenge Cup offered by E. W. Hackett) to Miss E. M. Powell, Ballingham Court, Holme Lacy, Hereford.

MILKERS' CONTESTS.

Class 102—Open to Men over 18.—*First* Prize (£5) to E. Askew, Cuckoo Hall, Bulk, Lancaster. *Two Second* Prizes (£2 10s. each) to J. Mathers, Burton, near Lincoln, and J. Duxbury, Knowle Green, Longridge, near Preston. *Three Third* Prizes (£1 each) to F. Sullivan, Rosewarne Farm, Woodham Ferris, Essex; A. Randall, Bower Farm, Havering Park, Romford, Essex; and John Loram, Carr's Farm, Halton, Lancaster.

Class 103—Open to Boys under 18.—*First* Prize (£5) to W. Brown, Hedge's Farm, St. Albans. *Second* Prize (£3) to H. Brown, Hedge's Farm, St. Albans. *Third* Prize (£2) to W. Hawkins, Sandling Farm, Maidstone.

Class 104—Open to Women over 18.—*First* Prize (£10) to Miss E. Masson, The Dairy Cottage, Floors Castle, Kelso, N.B. *Five Equal Second* Prizes (£3 each) to Miss E. M. Masson, Altimore Hall, Hatfield, Herts.; Miss S. Nelson, Cockerham Hall, near Garstang; Miss Bessie M. G. Dare, Bowshot Farm, near Charmouth, Dorset; Mrs. A. Askew, Cuckoo Hall, Bulk, Lancaster; and Miss E. Lewis, Pontantwn Farm, Pontantwn, Kidwelly, S. Wales. *Four Equal Third* Prizes (£1 each) to Miss R. James, Great Llancayo, Usk, Mon.; Mrs. M. Jones, New House, Staunton-on-Wye, Herefordshire; Miss R. J. Masson, Altimore Hall, Hatfield; and Miss M. Masson, Altimore Hall, Hatfield.

Class 105—Open to Girls under 18.—*First* Prize (£5) to Miss M. L. Nisbet, Lordship, Hinxton, Cambs. *Second* Prize (£3) to Miss E. M. Edwards, Pantysgawen, Newbridge, Mon. *Third* Prize (£2) to Miss D. Masson, Altimore Hall, Hatfield.

BRITISH DAIRY FARMERS' ASSOCIATION.

Report of the Council presented at the General Meeting of Members, October 6th, 1909.

In submitting the brief Report which it is customary to present on this occasion, the Council have the pleasure of once more congratulating the Members on the very large and representative exhibition now being held. The classes are well filled in the most important sections of dairy cattle and produce, although the totals in some cases have been exceeded on a few previous occasions, as will be gathered from the appended comparative statement:—

	1904.	1905.	1906.	1907.	1908.	1909.
Cattle	164	182	240	237	247	232
Milking and Butter Tests	167	217	247	245	224	236
Goats	46	51	51	48	72	84
Poultry	2,678	3,068	3,347	3,081	3,280	2,997
Pigeons	2,426	2,440	2,573	2,664	2,564	2,282
Poultry and Pigeon Appliances	—	—	55	65	50	37
British Cheese	250	268	255	420	357	355
Bacon and Hams	46	49	39	57	76	55
Butter	556	641	578	598	668	535
Cream	44	52	42	35	47	42
Skim-Milk Bread, &c.	140	121	159	118	135	115
Honey, &c.	122	124	118	67	85	88
New and Improved Inventions	43	22	17	33	37	31
Roots	184	170	156	177	181	218
Butter-Making Contests	172	206	199	200	207	120
Milkers' Contests	55	66	121	135	132	126
	7,093	7,677	8,197	8,175	8,362	7,553

The Council avail themselves of the present opportunity of announcing that arrangements have been made for the Dairy Conference and Excursions to be held in Holland. They are pleased to say that an assurance has been received that the Department of Agriculture in the Netherlands will give every assistance in connection with the visit, that the Association may rely upon the co-operation of different officials of the Department, and of introductions being given to Associations and private persons wherever desirable. Endeavours will be made to provide a suitable programme that will prove attractive and instructive to those taking part in the proceedings.

In accordance with the terms of the Articles of Association, the following Members of the Council retire this year, all of whom, except Mr. Robert W. Hobbs, offer themselves for re-election:—

Barham, G. Titus
Blackshaw, J. F.
Caddick, E. W.
Hobbs, Robert W.
Howman, H. R.
Lee, John
Pocock, S. J.
Ravenscroft, Birkbeck
Smith, J. A.
Tisdall, Alfred
Verrey, L. C.
Welford, John.

The following new Candidates have been nominated :—

NAME AND ADDRESS OF MEMBER	PROPOSED BY
AVIS, ARTHUR A., Stoke Bardolph, near Nottingham...	J. F. BLACKSHAW
ROBINSON, CHAS., Tollesby Farm, Marton, R.S.O., York	CHRIS. MIDDLETON
SHIRLEY, J. L., Silverton, Bletchley, Bucks...	CHARLES IBBOTT and WILLIAM NISBET
WALKER, ELDRED GEO. FREDERICK, The Hollies, Chew Stoke, Somerset	W. C. SPENCER.

The result of the scrutiny of votes will be announced at a subsequent stage of the present meeting.

By Order of the Council,

WILLIAM C. YOUNG,

Secretary.

Thirty-Fourth Annual Report of the Council to the General Meeting of Members, Wednesday, March 2nd, 1910.

In submitting this Report to the members, the Council are happy to record the continued success of the Association, both as regards membership and financially.

The Society now consists of 1,002 Annual and 74 Life Members, making a total of 1,076, as compared with 1,044 at the corresponding time last year. Also, two kindred Societies continue to be affiliated. Notwithstanding this slight increase, the Council would like to receive additional support during the year now commenced, whereby the usefulness of the Society, consequential with the increased income, might be materially advanced, and they particularly desire to solicit the members' co-operation in this direction by enlisting the sympathy of those engaged in dairying with the Society's objects. (*See* accompanying nomination form.)

As the result of members' votes, reported by the scrutineers at the Dairy Show, Mr. A. A. AVIS (Nottingham) and Mr. J. L. SHIRLEY (Buckingham) were elected to the Council, and Mr. W. S. BROCKLEHURST (Bedford) has since been chosen by the Council to fill the vacancy caused by the retirement of Mr. A. L. ALEXANDER.

The financial aspect, as shown by the accompanying Report of the Auditors and Accounts, is very gratifying to the Council. After commencing the year with cash in hand of £593 18s. 5d., notwithstanding the general work of the Society resulted in an excess of expenditure over income of £298 2s. 10d., and the Show a reduced profit of £256 12s. 6d. (compared with £424 17s. at the end of 1908), the year 1909 closed with a cash balance of £614 12s. 10d., a very satisfactory state of affairs.

As the result of a hearty invitation at the hands of a Committee of Local Dairy Farmers, the Annual Dairy Conference and Excursions were held in Cheshire from June 7th to 11th inclusive. The welcome accorded to the 95 members and Delegates who formed the party, by friends resident in the county, was of a very cordial character, and the excellent programme arranged with their assistance included visits to the Chester Cheese Fair, the County Dairy School at Worleston, and a number of well-arranged farms and estates at the invitation of noblemen and gentlemen interested in the welfare of the Society. The Council's indebtedness to all those who assisted in making the gatherings pleasurable and profitable, and thus assured the success of the Conference, is expressed in the Record on the four days' proceedings published in the Journal of the Society, Vol. XXIV., now in the hands of members. Included in that Report will be found the papers read and discussed on the Milk and Dairies Bill and the Tuberculosis Order, the Society's views being expressed in the following resolutions, which were unanimously passed :—

(1) "That inasmuch as the Tuberculosis Order under which cattle may be slaughtered is framed in the interests of public health, it is essential that any compensation for the purpose should be paid out of Imperial funds."

(2) "That whilst approving of the object of the Milk Bill, it is not, in the opinion of this Meeting, desirable to give a Government Department power to make Regulations and Orders under the Bill without these being subject to Parliamentary control."

(3) "That it is not desirable to violate the acknowledged principles of local government by giving power to one local authority to exercise jurisdiction within the area of another local authority."

(4) "That whilst approving of the provisions under which the Local Government Board is to make regulations for the protection against danger to health arising from the distribution of milk from abroad, this Meeting is of opinion that the regulations should be as effective and as stringently carried out as those affecting the home supply, and should also apply to all milk products imported from abroad."

These were subsequently confirmed by the Council, who saw fit to add the following, viz. :—

"That this Council urges the Government to charge the compensation paid for tuberculous cows on the Imperial Exchequer instead of on local rates, seeing that the bulk of consumers of milk live in large towns."

For the Dairy Conference and Excursions for 1910, Holland has been selected, and with the assistance of the Agricultural Department of the Dutch Government, who have promised every assistance, a programme covering a period of ten days is being formulated to present to the members, who are invited to avail themselves of the facilities to be thus offered to visit Holland in May next.

The Dairy Show, which is always one of the outstanding branches of the Society's usefulness, was again a complete success; and although the balance accruing from it is somewhat below the average, the Committee engaged in its organisation understand that the amount of business transacted on the part of exhibitors generally was considerably above the average, this view being upheld by the continued eagerness displayed in the early applications for space in the Hall which have been already received. The visiting public also patronised the Show in greatly increased numbers, and resulted in £177 more being received than was taken at the turnstiles in 1908, but against this the Committee's expenditure was slightly increased in their endeavour to make the Show of additional benefit to all those engaged in the dairy industry. The Dairy Show of 1910 will be held at the Royal Agricultural Hall, Islington, N., on October 4th, 5th, 6th, and 7th. The prize schedules are now being revised, and will be, on completion, issued to members and exhibitors.

The British Dairy Institute, Reading, which has been recently removed to more spacious and up-to-date premises, situated in the grounds of the University College, Reading, with the authorities of which the Council are still associated in its management, continues to attract a large number of students from all parts of the world. Towards the cost of its maintenance, which is a heavy strain on the Society's resources, although one of its most important objects, the Council hope to be again favoured by the Government with a grant of £300 as in past years.

Three Examinations for Diplomas and Certificates were conducted under the Society's Syllabus during the year, viz.: two at the British Dairy Institute, Reading, and one at the Essex County Dairy School, Chelmsford—the latter at the request of the Education Committee of that County. The following awards resulted :—

3 Diplomas and Silver Medals for proficiency in the science and practice of Dairying and Dairy Farming.

1 Teacher's Certificate for proficiency in the science and practice of Dairying.

3 Certificates of Merit for proficiency in the theory and practice of Butter-making and Cheese-making.

12 Certificates of Merit for proficiency in the theory and practice of Cheese-making.

23 Certificates of Merit for proficiency in the theory and practice of Butter-making.

The Council have also authorised a sum of money to be expended upon an investigation into the "Cellular Elements

present in Milk," which has been undertaken by Professor R. Tanner Hewlett, M.D., Mr. Sidney Villar, F.R.C.V.S., and Mr. Cecil Revis, A.C.G.I., F.C.S., whose preliminary Report upon the subject will be found printed in the Journal of the Society.

A subject which has always received the attention of the Council is the large amounts of Condensed Milk which are imported into the United Kingdom, and in view of the danger which they consider might result to infant life by the use of this article, twenty samples were ordered to be analysed, and are reported upon in the Journal. A resolution on the subject has been also sent to Members of Parliament, viz. :—

> "That in view of the fact attested by Medical Authorities that condensed machine-skimmed milk is dangerous as a diet for children, this Council is of opinion that every tin of condensed machine-skimmed milk should have printed upon its label in large type, the words 'UNFIT FOR INFANTS AND INVALIDS.'"

The Council also expressed their views with regard to the Milk Supply—London County Council (General Powers) Bill, viz. :—

> "That any legislation dealing with the milk supply should be general in its character and uniform in its application, and that pending such general legislation no further powers should be given to local authorities to deal with the milk supply."

In view of the Development Act now having been passed, the Council duly forwarded the following resolution to the Board of Agriculture, viz. :—

> "The British Dairy Farmers' Association desires to draw the attention of the Board of Agriculture to the great need which, it is their unanimous opinion, exists for more research work being carried on in connection with the industry of dairying, particularly in relation to the production of milk and the manufacture of various dairy products.
>
> "Further, the Association, having in mind the fact that dairying is fast becoming—if it has not already become—the largest and most important part of British farming, therefore they respectfully urge the Board of Agriculture to apply an adequate portion of the money devoted to agricultural research under the Development Act to the support of dairy research at the existing dairy farming centres."

The Council have been pleased to appoint five members to represent the Society at the Central Chamber of Agriculture, instead of three, as heretofore. They are :—

Captain R. Oliver Bellasis, Shilton House, Coventry.

Mr. J. F. Blackshaw, Midland Agricultural and Dairy College, Kingston, Derbyshire.

Mr. Thomas Carrick, J.P., Haydon Park, Haydon-Bridge-on-Tyne.

Mr. W. J. Grant, Pentonville, Newport, Mon.

Mr. James Kirby, Farley House, Boreham Wood, Herts.

and it would be an advantage if members would kindly communicate with the representative nearest to their district, in any matter connected with dairying, which they require brought forward at the monthly meetings.

The Council have, with very much regret, to report the resignation through ill-health of the late Secretary (Mr. W. C. Young), after many years of service. To fill the vacancy thus caused, the Council have been pleased to promote to the Secretaryship Mr. Frederick E. Hardcastle, who has been with the Society eleven years, and they feel sure that the members will always find him most anxious and ready to promote their interests and the important work upon which the Society is engaged.

By Order of the Council,

FREDERICK E. HARDCASTLE,

Secretary.

British Dairy Farmers' Association.

FINANCIAL STATEMENTS.

Dr. GENERAL INCOME AND EXPENDITURE ACCOUNT for the Year ended 31st December, 1909. Cr.

EXPENDITURE.	£	s.	d.	INCOME.	£	s.	d.
Rent	113	5	0	Members' Subscriptions	743	14	6
Salaries	371	16	4	Conference	288	13	4
Printing and Stationery	54	19	9	Journal	17	12	10
British Dairy Institute, Reading—Current year's work	160	0	0	Examinations	40	8	9
Examinations	70	15	6	Interest on Investments	74	16	4
Conference	306	14	0	Miscellaneous	5	18	8
Journal	148	14	0	BALANCE, being excess of Expenditure over Income	298	2	10
Education	19	9	10				
Postage	42	13	6				
Officers' Retaining Fees	31	10	0				
Auditors' Fees	18	18	0				
Investigations	10	0	0				
Analyses	21	0	0				
Law Charges	5	5	0				
Depreciation of Furniture	3	4	7				
Miscellaneous Expenses, including Subscription to Central Chamber of Agriculture, Mansion House Association on Railway Rates, Bankers' Charges, and Sundries	91	1	9				
	£1,469	7	3		£1,469	7	3

DAIRY SHOW INCOME AND EXPENDITURE ACCOUNT, for the year ended December 31st, 1909.

EXPENDITURE.

	£	s.	d.	£	s.	d.
Entry Fees returned	36	9	3			
Prizes to Exhibitors	2,696	11	9			
Sales of Exhibits	745	12	7			
Wages: Clerks and Assistants £180 19 2						
Do. Labourers 161 7 9	342	6	11			
Printing and Stationery	221	9	10			
Advertising	340	2	9			
Rent of Royal Agricultural Hall	445	0	0			
Fittings, &c.	589	13	7			
Forage (Hay, Straw, &c.)	64	10	11			
Band	73	10	0			
Judges and Stewards' Fees	479	6	6			
Refreshments	153	18	0			
Postage	77	11	6			
Working Dairies, Milk, Cream, Ice, &c.	136	3	6			
Light, Water, &c.	189	8	5			
Catalogue	214	0	11			
Police	73	13	11			
Turnstiles	32	10	0			
Steam	37	5	0			
Signs, Headboards, &c.	46	5	7			
Decorations	23	1	0			
Clearing Hall	10	0	0			
Analyses	34	2	6			
Miscellaneous Expenses: Insurance, Auctioneer, Badges, Rosettes, Lodgings, Baskets, Boxes, Bankers' Charges, and Sundries	188	4	8			
				7,250	19	1
Balance, being Excess of Income over Expenditure				256	12	6
				£7,507	11	7

INCOME.

	£	s.	d.
Entry Fees, Competitive and Non-Competitive	4,031	19	9
Catalogue Sales and Advertisements	285	4	2
Admission Money	1,964	14	7
Sales of Exhibits	866	18	4
Sales in Working Dairies, &c.	257	3	9
Contributions to Prize Fund	81	2	6
Miscellaneous	20	8	6
	£7,507	11	7

Dr. STATEMENT OF ASSETS AND LIABILITIES, December 31st, 1909. Cr.

LIABILITIES.	£ s. d.	£ s. d.
Sundry Creditors		104 5 6
ON ACCOUNT OF DAIRY SHOW, 1909:—		
Sundry Creditors		158 11 1
Surplus of Assets over Liabilities—		
As at 31st December, 1908	3,581 19 3	
Add—Excess of Income over Expenditure on Dairy Show Account ..	256 12 6	
	3,838 11 9	
Deduct—Excess of Expenditure over Income on General Account	298 2 10	
		3,540 8 11
		£3,803 5 6

ASSETS.	£ s. d.	£ s. d.
Investments at Cost:—		
£1,000 $2\frac{1}{2}$ per cent. Consols	938 4 10	
£800 L. & S.W. Railway 3 per cent. Debenture Stock	892 8 5	
£500 L. & N. W. Railway 3 per cent. Debenture Stock	475 0 6	
£500 Metropolitan Water Board "B" Stock	488 17 0	
		2,794 10 9
Furniture, £32 4s. 7d., less 10 per cent. depreciation		29 0 0
British Dairy Institute: Value of Appliances transferred to Reading ..		160 18 2
Show Appliances—Two-thirds cost of Pails		60 0 0
Sundry Debtors		57 14 9
ON ACCOUNT OF DAIRY SHOW, 1909:—		
Fees	20 2 0	
Advertisements	25 8 0	
Prize Fund	19 5 0	
Miscellaneous	21 14 0	
		86 9 0
Cash		614 12 10
		£3,803 5 6

REPORT OF THE AUDITORS TO THE MEMBERS OF THE BRITISH DAIRY FARMERS' ASSOCIATION.

We have audited the foregoing Income and Expenditure Accounts and Balance Sheet with the books and accounts of the Society. We have received all the information and explanations we have required. In our opinion such Balance Sheet is a full and fair Balance Sheet containing the particulars required by the Regulations of the Society, and properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the information and explanations we have received and as shown by the Books.

HENRY DUNN,
FRED. RAMSAY,
FREDK. R. WELFORD,
ANNAN, DEXTER, & CO.,
Chartered Accountants.
} *Auditors.*

January 28th, 1910.

THE

British Dairy Farmers' Association.

THE OBJECTS OF THE ASSOCIATION

are the improvement of

DAIRY STOCK AND DAIRY PRODUCE,

by encouraging the Breeding and Rearing of Stock for the special purpose of the Dairy; a larger and more general production of Butter, Cheese, and Eggs; the Erection of Improved Dairy Buildings, and the Invention of New or Improved Dairy Utensils, Machinery, Implements, and Scientific Appliances. The Association also stimulates the Breeding and Rearing of Poultry, &c. By means of papers in the Society's *Journal* (published annually), Annual Conferences in different dairy districts, Lectures and Discussions, and in other ways, efforts are continually being made to disseminate a more thorough knowledge of Dairy husbandry.

Prizes to the value of upwards of £2,500 are annually offered for competition at the Dairy Show held at the Royal Agricultural Hall, Islington, London.

It is difficult to over estimate the importance and need of greater attention being paid to the Dairy industry. It is admitted that by improved modes of managing Milk and its products, the wealth obtained from the Milch Cows of the country could be increased most materially. The Council therefore appeal to Agriculturists of all classes, and Dairy Farmers in particular, who, by becoming Members of the Association, will practically aid in developing its usefulness.

The advantages of Membership comprise :—

1.—A free pass to all the Society's Dairy Shows, available each day during the Exhibition, with the privilege of admitting free (by ticket) a friend on any one day.

2.—The Exhibition of Live Stock, Dairy Produce, and Utensils at a reduced scale of fees.

3.—A copy (free by post) of the *Journal* of the Association, published annually; price 1s. to non-Members.

4.—Analyses by the Analytical and Consulting Chemist, at low fees, of samples of milk, cream, butter, cheese, feeding stuffs, water, soil, manures, etc., and advice on dairy matters connected with his Department.

5.—Professional advice and assistance at a reduced scale of charges in any case of disease among the live stock of the farm.

6.—Examinations of plants and seeds by the Consulting Botanist on specially low terms.

7.—Examinations by the Consulting Pathological Bacteriologist for particular pathogenic or disease-producing organisms.

8.—Investigations by the Consulting Dairy Bacteriologist into the cause of trouble or taints in dairy produce.

9.—In any case of apparent hardship in connection with the administration of the Model Milk Clauses members are recommended to at once send details of such case to the Secretary, who will submit the matter to the Committee appointed to deal with such matters, after which advice and assistance will be given by the Association.

The annual Subscription is £1, but Dairy Instructors and *bona-fide* Tenant Farmers are admitted on payment of 10s. 6d. per annum. The latter sum entitles the Member to all privileges, except the reduced fees for exhibition at the Shows. A *bona-fide* Tenant Farmer is deemed to be one who rents the whole of the land in his occupation.

Members' Veterinary Privileges.

Members of the Association who require professional assistance in any case of disease among their animals must apply direct to the Consulting Veterinary Surgeon, Mr. Sidney Villar, F.R.C.V.S., Harrow, Middlesex, whose scale of charge is as follows:—

	£	s.	d.
Personal Consultation	0	10	6
Post-mortem Examination and Report	0	10	6
Consultation by Letter	0	5	0
Visit and Report, in case of an outbreak of disease, in addition to personal and travelling expenses, per day	2	2	0

Members' Botanical Privileges.

The Council have fixed the following rates of charge for the examination of Plants and Seeds for the *bona-fide* and individual use and information of Members of the Association (not being Seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination they require, *and to quote its number in the subjoined Schedule.*

No.	£	s.	d.
1.—A Report on the purity, and amount of nature of foreign materials, of a sample of seed	0	1	0
2.—A Report on the perfectness and germinating power of a sample of seed	0	1	0
Nos. 1 and 2 together	0	1	6
3.—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention	0	1	0
4.—Report on any disease affecting farm crops	0	1	0
5.—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value	0	4	0

Instructions for Selecting and Sending Samples.

The utmost care must be taken to secure a fair honest sample. When possible, at least one ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. Grass seeds should be sent at least four weeks, and clover seeds two weeks before they are to be used. In collecting specimens of plants, the whole plant should be taken up, and the earth shaken from the roots. If possible, the plant must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel. Specimens of diseased plants or of parasites should be forwarded as fresh as possible—either in a bottle, or packed in tinfoil or oil silk. All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstance (soil, situation, etc.) which, in the opinion of the sender, would be likely to throw light on the inquiry. Parcels or letters containing seeds or plants for examination must be addressed to the Consulting Botanist, Professor John Percival, M.A., University College, Reading.

The charge for examination must be paid, in Postage Stamps or otherwise, at the time of application, and the carriage of all parcels must be prepaid. It must be distinctly understood that *no notice can be taken* of any application unless it is accompanied by the proper fee.

Members' Chemical Privileges.

	£	s.	d.
MILK (Fresh).			
Estimation of Fat and Total Solids	0	2	6
Estimation of Fat, Casein, Albumin, Sugar, and Ash ..	0	10	6
MILK (Sour).			
Estimation of Fat and Total Solids	0	5	0
SKIMMED MILK.			
Estimation of Fat and Total Solids	0	5	0
CONDENSED MILK.			
Estimation of Fat	0	5	0
Estimation of Fat, Casein, and Solids	0	10	6
Estimation of Cane Sugar	0	5	0
HUMANISED MILK.			
Complete Analysis..	1	1	0
CREAM.			
Estimation of Fat	0	5	0
Estimation of Fat, Casein, and Solids	0	10	6
Examination for Foreign Fats	0	10	6
BUTTER.			
Estimation of Water, Casein, and Ash	0	5	0
Examination for Foreign Fats	0	10	6

	£	s.	d.
CHEESE.			
Estimation of Water, Fat, and Casein	0	5	0
Examination for Foreign Fats	0	10	6
RENNET.			
Examination of Strength..	0	5	0
CAKES AND MEALS.			
Estimation of Oil only	0	5	0
Estimation of Oil, Albuminoids, and Carbo-hydrates ..	0	10	6
GRASS, SILAGE, ROOTS, &c.			
Estimation of Oil, Albuminoids, and Carbo-hydrates, &c. ..	1	1	0
MANURES.			
Estimation of Phosphoric Acid	0	5	0
Estimation of Soluble and Insoluble Phosphoric Acid ..	0	7	6
Estimation of Nitrogen	0	5	0
Estimation of Potash	0	5	0
SOIL.			
Estimation of Lime	0	5	0
Analysis and Report	2	2	0
WATER.			
Analysis for Drinking or Dairy Purposes	1	1	0
POISONS.			
Examination of a Substance for Mineral Poisons	2	2	0
Examination for Organic Poisons (Alkaloids, &c.)	3	3	0
CIDER AND FERMENTED DRINKS.			
Estimation of Alcohol	0	5	0
Estimation of Alcohol, Sugar, Acidity, &c.	0	10	6
PRESERVATIVES.			
Examining a Substance for Boracic Acid or Salicylic Acid, &c., for each Substance sought	0	2	6
Estimation of the quantity of Boracic Acid	0	10	6
Analysis of a Preservative	1	1	0
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Examination for Artificial Colouring	0	5	0
CONSULTATION.			
For letter in reply to Enquiry	0	5	0
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Instructions for Taking Fair Samples for Analysis.

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Soils.—A block of soil about four or five inches square, and nine inches deep, should be sent in a strong box by rail.

Artificial Manures.—Take a handful of manure out of at least half a dozen bags, mix these rapidly and thoroughly, breaking down all lumps. Forward about a pound of the mixture in a tin box, and retain the remainder. Samples of manure should be sent immediately after the delivery of the bulk, and before settling the account. All manures should be bought subject to analysis.

Feeding Materials.—Feeding cakes, meals, or grains: About a pound should be sent in a bag or box. Grass and hay: A bundle of a few pounds weight. Silage: A six-inch cubic block, packed closely in a box to keep it compressed.

Waters.—A Winchester quart glass-stoppered bottle should be procured from a druggist, well washed out with the water, then completely filled, the stopper tied securely down, and the bottle packed in a box and sent by rail.

N.B.—In order to prevent disappointment, the Chemist requests that, as far as possible, Members desiring to hold a personal consultation should make an appointment by letter. Between 12 and 3 are the hours most convenient. The fees for analyses of artificial manures and feeding stuffs are payable in advance, and only applicable to Members who are not commercially engaged in the manufacture or sale of the articles sent for analysis. All communications intended for the Analytical and Consulting Chemist must be addressed direct to Mr. F. J. Lloyd, F.C.S., Agricultural Laboratory, Muscovy House, 6, Trinity Square, London, E.C.

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Butter is best sent in a ½lb. brick or roll, just as it was made up, wrapped in grease-proof paper, and packed in a box.

If the *Cheese* is small, send a whole one; otherwise, forward a square block of not less than one pound, and not a wedge-shaped piece. Wrap in grease-proof paper, and pack in a box.

All samples should be sent by the speediest method possible. They ought not to arrive either on Saturday or Sunday.

Samples to be examined for disease-producing organisms should be forwarded to Dr. Andrewes, Pathological Laboratory, St. Bartholomew's Hospital, London, E.C. Members are requested to note that in the case of examination for the tubercle bacillus the method of animal inoculation, which experience has shown to be the only reliable one, will be alone used. It is impossible to carry out the process of sedimentation necessary for the detection of tubercle bacillus in milk which is received in a curdled condition. The report cannot be sent for a period of four to six weeks from the time the sample is received, but in the case of other pathogenic organisms the time required is much shorter. Samples to be examined for organisms producing taints in dairy produce should be forwarded to Mr. F. J. Lloyd, F.C.S., Muscovy House, 6, Trinity Square, London, E.C.

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SMALL HOLDINGS AND DAIRY FARMING.

By James Sadler, Crewe Gates Farm, Crewe.

The title of this paper is in itself an attractive one. If we take the two component parts of the title each of them is of sufficient interest to claim our attention. "Small Holdings" is almost a term to conjure with. To a large number of people the very sound of it is euphonious. The social reformer, as well as the ploughman and the village blacksmith, see in it, or, rather, what it represents, from their widely different points of view, the realisation of some of their most cherished hopes; while the occupier of the larger farm regards it with somewhat mingled feelings. If he be a man of large heart he views it sympathetically, and in not a few instances sees in his striving, thrifty neighbour in a small way of business, a repetition of his own experience at an earlier period of his life. For not a few of our most successful farmers, men occupying large holdings, well stocked and well farmed, are only two generations removed from the cottage, and they are not ashamed of it. Why should they be? Turning to the other portion of the subject, "Dairy Farming" occupies a place in the public mind and thought which far and away exceeds the interest attaching to any other type of farming, and the reason of this is not far to seek, as an adequate supply of the products of the dairy—in the form of fresh milk, cream, butter, and cheese—is, next to our daily bread, of most pressing and vital interest to all of us.

When, however, small holdings and dairy farming are linked together, the topic is indeed an engrossing one.

In considering this subject, several questions of considerable moment immediately suggest themselves:

(1) What is the definition of a small holding, and to what extent is the demand for them met?

(2) What are the most suitable kinds of dairy produce for the small holder to aim at?

(3) Can the same amount *per acre* be produced as on the larger holding?

(4) Can the best quality of dairy produce be obtained on this class of holding?

(5) To what extent can co-operation assist the small holder in dairy farming?

(1) *Definition.*—Following the provisions of the Small Holdings and Allotment Act, 1908, a small holding may be anything in size from 3 to 50 acres. This, of course, gives a wide range, as it includes the cottage with its three acres and a cow, and also the holding which, with its large area of land, would—all other things being equal—provide constant employment for the occupier and his family, and at the same time secure to him a means of livelihood without any other additional source of income. The number of this class of holding is much larger than many people think, particularly in some counties. What the percentage—as compared with larger holdings—may be throughout the country I am unable to say, but some time ago I had occasion to go rather fully into the question so far as my own county is concerned, and found that on a number of estates, fairly representative for this purpose of the whole, the following was the position :—

Total number of holdings	2,233	
From 2 to 5 acres	656	= 29 %
,, 5 to 20 ,, ...	581	= 26 %
,, 20 to 50 ,, ...	254	= 11 %
Over 50 acres	742	= 33 %

This gives the interesting fact that on those estates which I repeat fairly represent the whole county, the holdings of from 2 to 50 acres are *two-thirds of the whole of the agricultural holdings*, and this was before a single small holding had been provided by the County Council under the recent Act. The figures also are exclusive of the very small holdings, of which there are many from ¼ acre up to 2 acres.

I do not for one moment pretend that this is an indication of the position of affairs in every county; had it been so, there would have been small need for the Act of 1908. There are wide agricultural areas in England which, so far as the farming population is concerned, is made up of the large farmer and the labourer, and so far as the land is concerned, the farmer has it all, while the labourer has just as much as his house stands on, with, in many cases, no great desire for more.

While this system, where it exists, is not an ideal one, it would be the worst possible folly to make any attempt to redistribute the whole of land by cutting it up into smaller holdings, thereby dispossessing the men who have the capital and ability to farm it and make it increasingly productive, in order to hand it over to men who at any rate would have to demonstrate by actual experience their ability to make an equally good use of it. This is, however, moralising, and to get back to the subject before us, we must assume that those who are at present occupying small holdings are generally capable men, and this brings us to our second point, viz. :—

(2) *What are the most suitable kinds of dairy produce for the small holder to aim at?*

This depends on circumstances. What are the alternatives? (*a*) Cheese-making, (*b*) Butter-making, (*c*) Milk-selling, (*d*) Stock-rearing.

I have not placed these alternatives in any order of merit or possible profit, but merely to cover the ground. Suppose we take the holdings of the smallest sizes—3 to 10 acres—where one to six cows could be kept according to the quality of the land and the amount of money spent by the occupier on artificial foods.

It will be obvious that in the majority of these cases butter will be the chief product, accompanied by the rearing of calves, and the breeding and rearing up to eight or nine weeks old of pigs. The most unsatisfactory feature of this kind of dairying is the low price of fresh butter, especially in the summer months when the cow or cows would be giving the largest quantity of milk and would get her living off the pastures with very little assistance. This is made up to some extent, however, by the valuable by-product in the form of buttermilk, which can be used with great success as indicated above. But even in these small dairies cheese-making has taken the place of butter-making to a considerable extent and is much more profitable, the chief difficulty in the way of its being more widely adopted being the fact that most of our standard types of cheese are made in sizes too large for the quantity of milk at the disposal of such small producers. The time will come, doubtless, when with the aid of our dairy colleges and farm schools this small-sized farm will take up the manufacture of one or other of the smaller types of cheese, and leave the less profitable manufacture of butter to our competitors all over the world where land, cows, and milk are cheaper than they are here or ever will be. When we come to the larger sizes of holdings, running up to 25, 40, or 50 acres, dairying is divided between cheese-making and the sale of milk to the factory (if there be one handy) or direct to the towns.

The position of the holding is, of course, a great factor in deciding which of these two courses is followed. If within four or five miles of a town, the milk is usually driven in by road ; in some cases sold retail by the producer, in other cases sold wholesale to a retailer.

If, again, the holding is within an easy driving distance from a railway station, the milk is sent to the town for sale, but if there are no facilities of this kind, then cheese-making is usually followed. The man who lives near enough to a town to deliver his milk at small expense and loss of time and no railway charges can find no method of dairying so profitable as the sale of his milk.

If his milk has to be sent by rail, and anything from ½d. to 1d. per imperial gallon paid in carriage, it becomes then a moot point whether milk-selling or cheese-making is the more profitable.

In further considering the relative advantages of the two types of dairying referred to much again depends on the type of small holding. If the land is too strong for a portion of it to be conveniently used for tillage, and the whole acreage is in grass, then the most natural kind of dairying is undoubtedly the manufacture of cheese ; but if the holder can, owing to the nature of the land, follow a system of mixed

farming and grow roots, cabbages, and other green fodder crops for winter feed for his cows which are in full milk, then there is no greater difficulty in milk selling (with a fairly even quantity the year round) in the way of the small farmer than the large farmer; it is merely a question of degree, and the small holder can make quite as good a price of his milk as a large producer, as his quantity of milk just suits the small retail dealer, of whom there are many on the market.

Of course, it would appear, looked at from a theoretical standpoint, that the incidental expense involved in sending milk to town, such as horse and float, time of man in driving the milk to the station, would be heavier in proportion to the small holder than the large farmer, as a man, horse, and float can deliver four churns of milk to a station as quickly as one churn; but, on the other hand, it must not be overlooked that the small holder would deliver his own milk, and would take greater care of all his live and dead stock employed in the undertaking than the average hired man would be likely to do. Moreover, in practice, it is the custom for the smaller farmers to join together for purposes of delivery, each one taking their turn for a week, and thus reducing the cost under that heading considerably.

As for stock-raising, it appears to me that there are only two types of small holders who can follow this profitably. One is the man with one to four cows, who combines butter-making with stock rearing. The other is the man who lives in a hilly district, where land is low rented, and he can therefore afford it. Moreover, the healthiest stock can be reared in that kind of country, which is a matter of vital importance to purchasers of dairy stock.

It would be of enormous advantage to the whole of the dairy farming community, small and large holders alike, if occupiers of small holdings in healthy, hilly districts suitable for stock rearing would fix their attention on that branch of dairy farming, and follow it, instead of competing in the milk market at great disadvantage to themselves, because of the distance from railway station or town, and at greater disadvantage and inconvenience to their compeers, whose holdings are not adapted, either from the point of view of rent or locality, for stock rearing, and are specially adapted for milk-selling; and who, in addition to the ordinary difficulties appertaining to their calling, find it increasingly difficult to find home-bred dairy stock at a reasonable price being offered for sale.

(3) *Can the same amount per acre be produced as on the larger holding?*

Undoubtedly. Why should it not be? Given the same knowledge of his business, the same energy in following it, there is no reason why the small holder should not beat his neighbour on the large farm in the amount of produce he turns out; in fact, in view of the higher rent he usually has to pay, he *must* do this or go under. The small holder is undoubtedly at a disadvantage as compared with the occupier of large farms in not being able to utilise labour-saving machinery in many ways, but that is more than compensated for by the increased personal attention which he is able to give to the details of his business, and particularly the feeding and management of his cows.

One extreme case of this kind I must cite. He was a working man and followed regular employment in a brick yard; the wife, with the help of the children, doing most of the farming. The holding was 10 to 12 acres in extent, and they kept five and sometimes six cows, fine specimen stoo. The milk of the cows they made into cheese, and such was the attention—constant and unwearying—that they paid to the feeding and management of their small herd, so liberal was the expenditure in artificial food, that the produce of the cows averaged 7 cwts. of cheese in the season; something like 50 per cent. more than the average results obtained. This was, I admit, an exceptional case, but it would have been almost impossible to have attained the same results from a herd of 50 cows, no matter how well they were managed, owing to the absence of that close personal attention which was the secret of the whole thing. This aspect of the question is of national importance as well as of individual interest.

(4) *Can the best quality of dairy produce be obtained on this class of holding?*

Again, the answer must be in the affirmative. Take the butter classes at the London Dairy Show. I do not know what the result generally would be if an analysis were made of the type and size of the holding of the successful competitors, but this I do happen to know, that last year a Cheshire small holder carried off three 1st and one 2nd prizes in the open classes, with a very strong competition.

In connection with the annual cheese shows which are held in Cheshire, it is usual for separate classes to be provided for small holders, and some excellent samples are shown, which compare very favourably in quality, though not, of course, in size with the larger dairies.

In connection with the sale of milk, some of the smaller dairies occupy a first place on the market because of the excellent way in which the milk is managed.

Given the same facilities in suitable premises to manufacture and store the produce, there is no reason why the small holder should not compete successfully with the large holder so far as quality is concerned.

There is one feature of the business, however, where it appears to me the small holder is at a disadvantage, viz., in the breeding of high-class stock. To purchase a first-class bull for stock purposes is less costly comparatively to the large farmer, simply on account of the extended use to which the bull can be put; but that is not so great a difficulty as formerly, owing to the great increase in the number of really good animals for stud purposes now available.

(5) *To what extent can co-operation assist the small holder in respect of his dairy farming?*

It seems to me that here is a wide field for the application of the principles of combination and co-operation. It is important that the large farmer should combine, but to the small holder conducting the business of a dairy farmer with all its attendant difficulties and risks it is *imperative.*

Leaving out of account, however, the question of combination in its widest meaning, to protect himself from undue encroachment on the part of railway companies or municipal authorities on the one hand, and from undue and unfair competition on the other, and confining oneself to the more precise term—co-operation. This should make the path of the small holder much straighter and smoother when adopted than it could possibly be so long as he is conducting his business on strictly "individual" lines. Co-operation will assist the small holder in the purchase of many things that he needs. Feeding stuffs, manures, machinery are some of them. Why should it not be applied a little further, and not only help him to *purchase* machinery on better terms than the individual, but also assist him in the *use* of machinery.

Then in connection with the sale and delivery of his produce, particularly his milk. The provision of factories in convenient centres would be a great convenience, especially if the milk from the small holders could be collected by the factory instead of being delivered by the farmer. Such factories, however, *must* be under the control of the producers themselves, and not milk buyers, if they are to be really serviceable, otherwise the factory proprietor is able in a large measure to control the price, which would be unfortunate for any farmer; but for the small holder it would be disastrous.

Another direction in which the small holder might be benefited by co-operation would be the provision of suitable bulls or other animals for stud purposes, which would enable the small holder to have the service of a first-class animal at a nominal charge.

To sum up, success or failure in dairy farming, whether on a small or large scale, depend largely on the man himself; but it must be added that, so far as the small holder is concerned, it depends more on his wife even than himself, for the reason that a large part of the actual work of the dairy falls on her, and the measure of his success is usually the measure of the skill and good management of the small holder's better half.

THE MANUFACTURE OF STILTON AND WENSLEYDALE CHEESE.

By JOHN BENSON, The Dairy, Kettering.

The manufacture of Stilton and Wensleydale cheeses, and the comparative value of the various systems, has of late been much discussed amongst those interested in dairying, and the subject is always an interesting one to the cheese-maker. To be able to produce a prime blue-moulded cheese of either variety is considered to be a mark of distinction amongst the dairying fraternity, and justly so, as either of these two cheeses when well made are amongst the best the world produces.

In this article it is not proposed to enter into details of the various systems of manufacture—the advantages and disadvantages of each—but rather to discuss general practices and the conditions of the industry generally, and suggest if possible improvements for the future.

Compared with the manufacture of Cheddar and allied cheeses, the progress made towards the improvement of the general quality of these blue-moulded cheeses has been small; in fact, I do not consider that either the Stilton or Wensleydale cheese as now made are much, if at all, better than they were ten years ago. Some problems have been elucidated, but with the concentration of the work of Stilton cheese making in factories other difficulties have arisen which will have to be overcome. A wide field is here open for competent dairy specialists, and I should like to see some of our qualified dairy instructors take up the work energetically and endeavour to overcome many of the troubles which face the maker of blue-moulded cheeses, and further attempt to systematise the various methods of manufacture and to evolve therefrom some definite rules for the guidance of all those who are engaged in this industry. It is a wide and complicated question, but with co-ordination on the part of our excellent dairy schools much might be done to place the industry on a sound basis.

That the district—the class of soil and herbage in that district—has a great influence on the flavour and quality of Stilton cheese is fully admitted; but, apart from this, good Stiltons can be made in most of the best cheese-making districts of England and in other districts where the land is sound and the herbage of good quality. On the other hand, choice Stiltons have not as yet been made generally outside the true Stilton cheese making districts which are situated in North Leicestershire and South Notts, or within a certain radius of the town of Melton Mowbray. In this district all farms are not alike for the cheese-producing qualities of the milk, but in the best cheeses made in this particular locality there is a certain indefinable, desirable

flavour which is seldom found elsewhere. It would be interesting to know why this is so. Is it entirely due to the quality of the herbage, or is it in part also due to the association of this particular cheese-making industry with this district for a century or more? It may be that desirable ferments which go to make up the quality of the cheese are abundant, and especially on the farms on which Stiltons have been made for generations. To a certain extent this latter statement is confirmed by the fact of which the writer has had personal experience that in a new dairy or cheese factory, erected in what is considered the best Stilton cheese making district of Leicestershire, the cheeses for a year or two were not really choice in quality, but tended to improve year by year till a certain standard of excellence was reached above which it was impossible to go. Here I think we have confirmation that certain ferments are responsible in part for flavour, but how much value to place on the effects of the ferment and how much on the quality of the herbage of the district it is at present impossible to state. Cheeses made in the Melton district are not, however, invariably good; but usually defects can be traced to lack of skill on the part of the maker, to faulty dairies, and unclean milk, or to weather effects, especially in hot and dry summers. This is a question requiring elucidation. It is possible, considering the matter from the view of some who consider that the district is of primary importance, that there are other districts of considerable area in England which might be eminently suitable for the manufacture of Stilton cheese. On the other hand, it should be possible to isolate the bacteria which are found in the best cheeses, and by so doing ascertain if it were possible to transmit the good qualities of the Melton cheeses to other areas.

In taking the records of prizewinners at the London Dairy Show for years past, it will be found that nearly the whole of the prizes have gone to makers in North Leicestershire and South Notts, and seldom do cheeses made in other districts figure in the prize lists.

The case would appear to be analogous to that of certain wine-producing districts in France which produce wines of a quality and flavour not obtainable elsewhere.

Stilton cheeses are made both in the farm dairies and in cheese factories, the latter dealing with the mixed milk of a number of farms. On a farm or single-herd dairy, the cheeses are made from the mixed curds of two meals of milk. In the factory usually the cheeses are made from the curd of each single meal of milk. If the milk in a single-herd dairy is carefully handled by a skilled farmer, the cheeses, I consider, are usually better than the factory-made cheeses. Perhaps they ripen more slowly and are not quite so soft; but, on the other hand, their appearance is better, and they are not subject to the discoloration or "staining" in the body of the cheese which is such a great fault with factory-made Stiltons. The cause of this unsightly and disagreeable discoloration in many factory-made cheeses requires investigation. The factory proprietor may claim that of late years his produce has gained most of the prizes at the cheese shows in

competition with the farm-dairy cheeses, but this is not altogether evidence of the superior quality of his produce. I should ascribe it to the fact that in recent years exhibitors at shows have been allowed by agricultural and dairy societies to test their exhibits before forwarding to the show. It follows that the factory having its hundreds of cheeses to select from has a much better chance of securing a dozen prime cheeses than the dairy making, say, three or four cheeses daily. To this I attribute the success of the factories in the matter of winning prizes. It is admitted that in factories the curd must be forced, so that the large quantities of milk purchased can be disposed of quickly. Also with milks of varying quality and colour the single-curd system is probably the best, but the question to be solved is which makes the best cheese—the farm dairy spreading its operations over 24 hours or so with mixed curds, or the factory making all its cheeses with single curds, allowing only a short period for souring and ripening. In factories, to push the cheeses on to the proper condition for hooping in a short time, temperatures have to be kept up and a large quantity of moisture left in the curd, and generally the curd is put up in a soft, moist condition. This conduces to a soft and rich condition of the cheese when ripe; but, on the other hand, it also renders the cheese liable to numerous faults.

Discoloration—or what is known amongst cheese-makers as "staining"—of the curd is very prevalent, and this trouble tends to increase. This fault is more generally found in May and June cheeses, and is probably due to certain bacteria which are fostered in the high, moist, and contaminated atmosphere of the factory. In these places large quantities of milk are handled and temperatures are usually high. In certain instances the curd may have been slow in acidifying, and in such circumstances the rooms are kept closed and unventilated. Curd exposed under such conditions becomes slimy on the surface, and it is with such curds that staining and discoloration is most prevalent. Careless salting of the curd is also a fruitful cause of discoloration, but this differs in many respects to that described above and the remedy is obvious. Factory-made cheeses are slimy on the outside, rough in appearance and unsightly, and lose weight rapidly. They lack the nicely wrinkled drab coat found in the best farmhouse cheeses. These faults are due to the system of manufacture. Some other system or method of inoculating the milk previous to renneting is necessary. In a factory where a large number of cheeses are made daily from mixed milks, the tendency is for the curd to sour and ripen rapidly. To counteract the bad effects of this quick ripening on the ultimate quality of the cheese, the curd is usually put up sweeter than a naturally ripened curd, and it also contains an excessive amount of moisture. This practice tends to the production of an apparently rich, soft-bodied cheese; but, on the other hand, the inclusion of excessive amounts of moisture in the cheese, coupled with an under-acid condition, is mainly responsible for the large number of second-rate cheeses produced in factories. With the factory system there are also other drawbacks. It is difficult for the manager to ensure that all

suppliers are sending in milk in clean and perfect condition, and one lot of bad milk, which may not be distinguishable at the time, may ruin the whole of the day's make. This opens up the question of the use of "starters" in Stilton cheese factories, or of the introduction of methods which will enable the maker to ensure a clean milk, and so handle and deal with it as to produce a good cheese within six or eight hours. Many makers have been induced to use starters in order to make their cheeses quickly. These starters in the past have been preparations of pure cultures of lactic bacteria—bacteria that are capable of producing lactic acid in milk—and usually put up in powder form by Continental manufacturers. However, after careful trial of such starters, their use has been abandoned by all the best makers. Cheeses made with the form of starters as usually supplied, were free from many of the minor defects of the factory-made Stilton; but, on the other hand, flavour and texture were ruined. During the first processes of manufacture all seems to be satisfactory, but later the cheeses dry inordinately and become hard and valueless.

The maker of Cheddar and similar pressed cheeses develops artificially by the aid of a starter, such as described, a certain and desirable acidity in the milk. He rennets and cuts the curd within specified times. He cooks or scalds the curd in the whey to a certain condition, and when the whey is drawn he develops a definite degree of acidity in the curd. When the proper stage is reached, he grinds and salts the curd and puts it to press, and by so doing practically stops at this stage the further production of acidity. The excess of moisture in the curd is expelled, and the draining action of the lactic acid ceases. If the cheese remained unpressed the acidifying process would continue and the resultant cheeses would be hard. Here the acid-producing ferment is the servant of the cheese-maker. He deals with it and is able to do so in such a manner as to produce specified results. The quality of his cheeses may vary somewhat, but never to the extent found in Stiltons. Slight contamination of milk in Cheddar cheese making does not matter. The bad effects can be rectified by the use of a starter in the hands of a skilled maker; but the case is entirely different with the maker of a Stilton cheese. Here the maker is servant to the ferments that may be in the milk. If the ferments happen to be of the right variety then all goes well, but if otherwise, the quality of the cheeses suffer and the maker is helpless. Supposing, for instance, that milk is contaminated. The Cheddar cheese maker can rectify this, but in the Stilton the action of these ferments continues, and finally the cheese is spoilt. Supposing, further, that a lactic acid producing bacteria has been introduced into the milk in the form of a starter in Stilton cheese making. The peculiarities of the process of manufacture do not allow of the action of this ferment being retarded or stopped at any given time. The action of the ferment proceeds whether for good or evil during the whole life of the cheese. A new Stilton contains an excessive amount of moisture in the form of whey, and moisture tends to the further production of acidity. In the whey contained in the cheese there is, of course, a large percentage of milk

sugar, and the lactic acid producing bacteria continue to act upon this sugar, forming large quantities of lactic acid. This acid in excess has a contracting effect upon the curd. It tends to expel moisture, and this effect continues during the whole period of ripening, hence cheeses made by the aid of a starter may appear all right at the beginning, but later they turn out hard and dry and of little value. Too much acid is formed in the unusually wet curd, the curd contracts, and moisture exudes through the surface of the cheese to such an extent as to render the cheeses hard and dry. A rich milk is desirable in the manufacture of Stilton cheese, but the butter fat in the cheese is of little value except when combined with the proper degree of moisture. A correct proportioning of the butter fat to the moisture in cheese is what we require, but in using the ordinary starter we do not obtain this, as the moisture content of the cheese is reduced to too low an amount.

If pure milk is soured and ripened under normal and natural conditions, the proportion of fat to moisture is generally correct; but it is evident from this that some other than the ordinary lactic ferments of milk are at work. Experiments have been made with certain lactic acid producing ferments which possess, in only a moderate degree, the power of expelling moisture, but the work has not proceeded far enough for me to give out any definite results. It has also been found that using pasteurized milk the moisture-expelling properties of ordinary starter are not so pronounced, but further experiments in this direction are needed.

It is possible in the manufacture of Camembert cheese to add a starter containing the desirable ripening ferments of this cheese to the milk, and so secure proper flavour and mould growth in the cheeses made therefrom. I see no reason why the same should not be done with Stilton and Wensleydale cheese. The ordinary commercial starter of *bacterium lactis* is, however, not the right thing. Probably a combination of this and other ferments is what is required, and experiments in this direction are necessary. In the manufacture of Cheddar it is good policy to develop acidity and ripen the milk before adding rennet, but to get proper flavour and condition in any blue-moulded cheese made from whole milk, the acid must have been developed in the curd, the maker commencing with a perfectly sweet and fresh milk. An old or acid milk makes a tight and close curd, whereas in Stilton and similar cheeses we require an open, friable curd. I should like to see the Stilton cheese making industry put upon the same footing as Cheddar, and I believe with a proper selection of ferments that this is possible. At one time it was thought necessary, to secure good results, to extend the operations of Cheddar making over a period of 24 hours, but this practice is entirely superseded now, most makers being able by the use of a starter to finish the whole process and with satisfactory results in a period of from six to seven hours. Imagine the advantages which would accrue if this were possible in a Stilton cheese dairy.

Another question which engages the attention of the cheese-maker is as to the variety of rennet he should use for the coagulation of milk. Should rennet be prepared at home from the vells direct or should rennet extracts be used? Most of the best makers of blue-moulded cheeses favour the home-made article, declaring that commercial rennet extracts ruin the quality of their produce. In practice, I believe that better results are obtained by use of the home-made rennets if the vells are properly cured and the rennet correctly prepared. Often, however, bad vells are used and an evil-smelling preparation is produced, the use of which is responsible for many badly flavoured and inferior cheeses. If rennet is to be prepared at the dairy, then it becomes incumbent on the part of our dairy instructors to impart this knowledge to cheese-makers, as few understand the principles of the manufacture of rennet.

The value of home-made rennets rests in their slow coagulating properties. The curd made with such is mellow and possesses character, differing entirely from the tough, hard curds produced if certain brands of rennet extracts are used. There are, however, some brands of rennet extracts on the market which produce curd possessing the desirable qualities which are obtained by the use of a good home-made rennet.

It must always be borne in mind that quick coagulation of the milk in Stilton and Wensleydale cheese making is fatal to the quality of the cheese. A quickly formed, tough, leathery curd will never produce a cheese of really good quality. The curd should be firm but short in texture and friable, and in this condition it will drain and afterwards develop a proper mould growth, whereas the tough, leathery curd will become soapy and discoloured during ripening and the cheese will fail to mould properly.

With reference to the curing and ripening of cheeses, I do not consider that sufficient care is exercised by cheese-makers in the selection and use of salt. Many ordinary salts are impure, and contain compounds of lime in such quantities as to have a deleterious effect upon the cheeses. A bad or impure salt will cause discoloration and soapiness, and often is responsible for a fishy flavour in cheeses. Also an excess of salt has the same effect as an excess of acidity, in that it tends to harden the albuminous matter of cheeses and to expel moisture. The whole question of the addition of salt to cheese requires reviewing. There is too much left to chance, a fixed quantity per 100 lbs. being added, and no account taken of the varying conditions of the curd as regards temperature, moisture content, ripeness, &c. With the Cheddar type of curd, the amount of salt to be added can be pretty well defined, as such curds contain quantities of moisture which vary little day by day; but this is not the case with a Wensleydale or Stilton curd especially.

As to the ripening of Stilton and Wensleydale cheeses very little need be said. The whole process of after ripening and curing is well understood. A cheese is made or marred during the first few hours, and no amount of pains taken in the after-curing will correct the faults of an inexperienced or careless cheese-maker or turn a badly-made

cheese into a good one. This is especially true of the Stilton type of cheese. If the curd is under-acid or chilled at salting, no amount of skewering, turning, and manipulation will get rid of the excess of moisture—at least for the first few days—and, in the meantime, the flavour and quality of the cheese have been ruined. If, on the other hand, the curd has been too sour or over-ripened, the cheese will drain and shrink abnormally in spite of all the efforts of the maker.

Of course, the cheese-making properties of milk will vary in different dairies, but it rests with the maker to find out the peculiarities of the milk with which he has to deal and vary his operations accordingly.

I have dealt chiefly with the manufacture of Stilton cheese, and what has been said applies in great measure to the manufacture of Wensleydales. In connection with the production of Wensleydale cheeses, however, the district where the cheeses are made does not seem to be of such prime importance. Excellent cheeses of this variety are now made in all parts of England, and are equal in almost all respects to those made in the dales of North Yorkshire.

The correct flavour of a Wensleydale cheese appears to be dependent upon mould growth, and the efforts of the maker are concentrated upon producing a curd in which the correct type of blue mould will grow luxuriantly. For the proper growth of the blue mould, the acidity in the curd of a cheese must be developed *after* the addition of rennet. If before, we then get a Cheddar-flavoured type of cheese and a cheese which has a close texture with no inclination to mould growth. However, some makers now add a few drops of a lactic starter to the milk just previous to renneting, and I am inclined to think that this is good practice.

In the small dairies and homesteads in which these cheeses are usually made temperatures are low, artificial heating being seldom resorted to. It is evident that under these circumstances acidity develops slowly, and the cheeses being subject to a moderate amount of pressure at the end of 20 hours or so, the action of the lactic ferment is mitigated. Perfectly fresh milk is, however, necessary if the cheeses are to be made of good quality, and the curd should be short and similar in some respects to that of a Stilton. These cheeses, as has been said before, in the first stages of manufacture are held at low temperatures, hence opportunity must be given for acidity to develop and for the whey to escape.

It is the practice now to complete the actual process of manufacture in six or seven hours, but to allow the cheese to stand overnight in the hoop before pressure is applied. To develop just the right amount of acidity in the curd so that the drainage overnight will be sufficient requires a great amount of skill and experience on the part of the maker, and it is just here where many fail. If drainage proceeds too far, then the cheeses are close and tight and resemble Cheddar; whereas, if the drainage is not sufficient, the cheeses ferment when taken to the curing room and rapidly become discoloured and putrid in the centre.

The pressure applied to Wensleydale should not entirely consolidate the cheese, but leave it open in texture, so that later on the mould spores may enter and complete the process of ripening. The whole secret in the manufacture of choice Wensleydale lies in the ability of the maker to determine if the right amount of acidity has been developed at the salting stage. A Wensleydale cheese, if properly made, should be sharp and acid to taste in the earlier stages of ripening, and if in this condition it will mould and ripen out properly. I am speaking now of the blue-moulded Wensleydale. Many cheeses are made and sold in the industrial districts of Yorkshire in the white or unripened state, and at this stage they resemble a Cheshire cheese.

Twenty years ago the writer made an extended tour of the cheese-making districts of the Dale of Wensley and adjoining dales, and had ample opportunities of studying the manufacture of this cheese. At that time many dairies were producing excellent cheeses, while in others the process was a complete failure. A systematic method of manufacture was formulated and put into operation by teachers appointed by the North Riding County Council with, I believe, good results. The system recommended at that time has not been altered much, except that now it is thought advisable to use small quantities of a starter and to leave the cheeses unpressed for a longer period.

A Wensleydale cheese when well made and properly ripened is, in my opinion, the best blue-moulded variety of cheese in the world. There is nothing to equal it, but to secure good results the milk must be fresh and sweet, and to this I ascribe the success of the small dairies who are able to deal with perfectly fresh milk. Any mixing of a number of milks as in an ordinary cheese factory is usually disastrous to the good quality of the cheese. I only know of one or two factories where the manufacture of Wensleydale is a success, but in these instances the selection and care of the milk supply receive most careful attention. The Wensleydale is eminently a cheese for the small-holder. It requires very little in the way of buildings, utensils, &c., and offers great possibilities of being a profitable industry.

LANCASHIRE CHEESE MAKING.

By T. H. Holborn, County Chambers, Fishergate, Preston.

In dealing with so practical a subject as Lancashire cheese making, it may be expedient to allude to the rural conditions of Lancashire and to a few other matters which have a bearing upon it and on which cheese-making depends partly for its success.

There are people living some distance from Lancashire who appear to be under the impression that the county is unsuitable for agricultural purposes owing to the large urban population, and the great coal, cotton, iron, and other industries that are carried on, but it may be mentioned that Lancashire has more land under cultivation than the neighbouring agricultural county of Cheshire.

Lancashire possesses great natural advantages; it has an extensive seaboard, it is drained by the rivers and tributaries of the Mersey, Ribble, Lune, and Irwell. It is bounded on the west by the sea, and on the east by the mountains and moors of the Pennine Range; on the north by Westmorland and the south by the county of Cheshire.

The climate is of a humid character, which has made it so eminent for the manufacture of cloth. The weather is milder in the south and west than in the north and east. There is a fairly heavy rainfall as compared with other parts of England.

The soils of Lancashire vary very much in character, consisting partly of peat, black loam, gravel, sand, sandy loam, clay loam, and clay soils, and we find almost every description of agriculture being practised. Between the Mersey and the Ribble there are several plains with soil of turf and black loam which are highly cultivated in many places for the production of market-garden produce.

Mixed farming is carried on between the Mersey and the Ribble and in the Fylde.

On the east side of the county what is locally known as "green side up," or grass farming, is carried on. The farmers have devoted their time to the rearing of stock, making butter, and selling milk, but during the last few years a great many have turned their attention to the making of cheese, which has been found to be more profitable than other branches of farming than were carried out previously.

The dairying industry of Lancashire is an extensive one, owing to the large town population. An enormous amount of milk is required for consumption, and a large number of the farmers in the county are engaged in the production of this commodity on farms which are within a reasonable distance from a railway station. Special trucks or carriages are used on some of the railways for conveying the milk to the towns. On farms adjacent to the towns the farmers or

"kitters" are generally engaged in producing and retailing milk at a price which in good seasons is fairly remunerative, especially if the farmer is fortunate in having a good milk round.

The low price of milk is a matter which has been occupying the minds of farmers in Lancashire for some time, but it was not until 1907 that any combined efforts were made to obtain a reasonable price. During that year the Lancashire Farmers' Association, which is a strong body with a membership of about 2,800 members, organised the milk-selling farmers, who were able to get a considerable advance in the price of their milk.

This has greatly influenced the cheese trade, because, when milk is sold at a fairly remunerative price, it has a tendency to cause cheese to command higher prices.

Although a great many farmers in the county are engaged in producing milk for the population in the towns of Lancashire, there are a large number who make their living by making and selling cheese.

On reading the "History of Agriculture in Lancashire," we find that over a hundred years ago Leigh was noted for its toasting cheese, but to-day most of the farmers near to Leigh are engaged in producing and selling milk. Most of the Lancashire cheese at the present time is made in that portion of the county lying between the Ribble and the Lune, which includes the Fylde.

The farmers in the Inglewhite, Goosnargh, and Garstang districts have been the most successful competitors for the prizes offered at the recent dairy shows.

Valuable prizes are offered by the Royal Lancashire Agricultural Society, which is a very strong body with an active and enterprising secretary and committee. This society offers prizes at the show, which is usually held about the end of July of each year, and prizes are also given at the Dairy Show, held a short time previous to Christmas.

The Christmas Dairy Show was formerly always held in Preston, and was known as the Preston Cheese Show; but in 1907 the Royal Lancashire Agricultural Society took the Preston Society over, and the shows are now held in different towns. As the shows have been well advertised the cheese has become more widely known.

Exceptional opportunities are offered to the Lancashire farmers, their wives, and families to learn the art of cheese-making by the County Council, which possesses an enterprising committee, including those two well-known gentlemen, Mr. Fitzherbert-Brockholes and the Rev. L. C. Wood, who have done so much for agriculture in Lancashire.

Free tuition in cheese-making, as well as free board and lodging, are provided for the sons and daughters of farmers and others resident in the county at the County Council Farm, Hutton.

The most approved methods are adopted, and modern machinery is used in teaching the pupils how to make good Lancashire cheese.

The practical as well as the scientific part of cheese-making is taught under the able management of Miss Macqueen and Miss Knowles

Mr. A. W. Patten, B.Sc., is a teacher in dairy bacteriology who has done useful work in this class of science.

Should any farmer or any of his family be unable to attend the farm at Hutton, he may obtain the services of Mr. Joseph Gornall, who is a migratory teacher of cheese-making under the County Council. Mr. Gornall will visit the farms and teach the farmer or his family how to make Lancashire cheese. Mr. Gornall is a practical and successful farmer and is the inventor of the Gornall Patent Cheese-maker, a utensil used by Lancashire farmers which has saved an enormous amount of labour in cheese-making.

His services are in very great demand, and he has done a great amount of useful work not only in teaching beginners how to make cheese, but also in improving the quality of Lancashire cheese generally.

The County Council also carry out a useful work in employing an expert to visit the farms for the purpose of testing the cows with a view of ascertaining the quality and quantity of milk given by the animals. This gives valuable information to the cheese-maker, as he is able to determine which are the best animals in the herd for producing milk, and consequently the most cheese. The results of those experiments show that in herds of different farms tested in this way there is a wide difference in the amount of milk given by the different animals. One cow gave a yield of 835 gallons of milk in a year, whilst another animal gave only 279 gallons in the same period of time.

If the farmers of Lancashire continue to test their cows as to the quality and quantity of milk given by them, and eliminate those animals which give the worst results, and breed from the best animals, it will be seen that the improvement in the breed of milk cattle will be enormous, and consequently a larger quantity of cheese will be produced with a smaller number of cattle than is being done at present.

It may be mentioned that there is a tendency for Lancashire farmers to breed pigs instead of rearing calves, with the result that thousands of calves are being slaughtered annually, and if this continues it will undoubtedly be inimical to the dairying interests of the future.

THE METHOD OF MAKING LANCASHIRE CHEESE.

Lancashire cheese is one of those types which are of a soft, open, and meaty texture, but are neither spongy nor yet too crumbly.

To make a Lancashire cheese great skill and care are required and scrupulous cleanliness is essential. It is imperative that cleanliness should be observed throughout the whole process of treating the milk or while handling the curd or cheese.

The shippon, cows, the milkers, and also the places where the milk is treated should be clean, or the cheese may be found to be of a faulty character.

Milk is a liquid which easily absorbs unpleasant odours, and it is advisable not to allow such food-stuffs as turnips, cabbage, silage, &c.,

to be given to the animals immediately before or at the time of milking, or the milk may become tainted, and the cheese will become affected.

Lancashire cheese is made by mixing the evening's milk with the milk obtained the following morning. The evening's milk is strained immediately after being taken from the cows, and is put into a vat and stirred once or twice to aerate it and to prevent the cream from rising to the surface as much as possible.

It may be necessary, where there is an excess of fat in the milk, to remove part of the cream, but on the majority of farms the whole of the fat is allowed to remain in the milk. No hard-and-fast rule can be fixed, as the milk on each farm varies considerably.

The fluctuations in the composition of milk on the different farms is believed to be due to the different soils and herbage, as well as the situation of the homestead, and that is believed to be the reason why some cheese-makers do not make such good cheese on a fresh farm as they did on the previous one. It is therefore necessary for cheese-makers to adapt themselves to local conditions when carrying out the general principles of making Lancashire cheese.

To make a firm cheese of good flavour it is necessary that a certain amount of acidity should be formed in the night's milk. If the milk is not cooled sufficiently in hot weather, too much acidity will be formed, and the cheese will turn out to be too dry and crumbly. If the milk is allowed to become too cold during the cold weather, too little acidity is formed, and the cheese will turn out to be soft, soapy, or spongy, and of bad quality, and produce binged cheese.

It is customary on a good many farms for the cheese-maker to raise the temperature of milk before adding the rennet to 80° or 82°, but in winter a higher temperature is required, and the milk is heated 84° or 85°.

On some farms there is a higher yield of curd than on other places, and in autumn or winter a greater quantity of curd is obtained than in the summer months, when the animals are in the flush of milk.

The following table illustrates fairly the distribution of the constituents of milk in an average Lancashire dairy where cheese is made :---

	Milk.	Curd.	Whey.
Water	87·00	6·50	80·50
Fat	3·90	3·60	·30
Casein	3·00	2·80	·20
Albumen	·60	·05	·55
Ash	·75	·25	·50
Sugar	4·75	·30	4·45
Total	100·00	13·50	86·50

Thus, from 100 lbs. of milk there is about 13·5 lbs. curd.

No hard-and-fast rule can be fixed as to the best heat at which to keep the night's milk, as the milk on the different farms varies considerably. Only experience can teach the cheese-maker how to act under these special conditions of soil. On some farms the milk will

not become acid if left uncooled, while on other farms it will become acid even when cooled. On a large number of farms the milk is cooled at night to from 68° to 75° Fah., according to the weather and the place of keeping the milk, so that it may be anywhere between 60° and 68° Fah. by the following morning. The morning's milk is added to the evening's milk, and the temperature is raised to 80° Fah. if the vat is half full, 78° Fah. if the vat is full, and 82° Fah. if there is only a small quantity of milk. There does not appear to be any hard-and-fast rule as to the temperature of the milk, but it seems to fluctuate between 78° and 88° Fah. The temperature of the evening's milk as well as the morning's milk is taken before mixing.

Adding the Rennet.

After mixing and heating the morning's and evening's milk, rennet is added at the rate of 1 drachm to 2 or 3 gallons of milk, according to the strength of the rennet, the rennet having been previously diluted with four times its bulk of water. As there are a great many different strengths in the rennet sold in Lancashire, the cheese-makers can only ascertain by practice how much rennet should be added to the milk. Unfortunately, there is no law to prevent dealers from purchasing high-class rennet, and after diluting it, sell it to the cheese-makers. There is at present a Bill known as the "Sales for Agricultural Purposes Bill," which, if passed, might check a great amount of fraud if it made it illegal for any person to sell rennet below a certain strength or standard.

After the rennet has been added to the milk it is stirred for three minutes, and the vat containing the milk is covered.

About 10 or 15 minutes afterwards some cheese-makers move the surface of the milk with their fingers, so that the cream may be mixed with the milk below the surface to the depth of two to three inches, taking care that the milk has not already begun to thicken. Should the thickening of the milk have begun before this, it denotes the presence of a good deal of acidity.

After the milk has been allowed to stand for about 45 or 50 minutes, and become coagulated sufficiently for a piece of curd to break cleanly over the finger, the curd is broken up or cut into small pieces by means of sharp knives.

Sometimes the curd is broken up with the cheese-makers' hands, and this necessitates great skill and care, as the curd is soft and the fat is liable to escape, which is shown by the whey being white.

Even with the utmost care it is impossible to prevent a certain amount of loss of fat to occur when making cheese, as it will be noticed in the above-mentioned table. Should there be a large amount of fat removed, the value of the cheese is decreased considerably, as the casein which is left may be hard and brittle or tough and leathery, according to the temperature. It is owing to the fat being present that we get that mellowness, richness, and quality in cheese. A good deal will depend upon the skill of the maker as to whether a cheese

will show as much quality or richness when made from milk rich in fat, as the richer the milk the better the quality should be; but it is more difficult to extract the whey from the curd. When dealing with rich milk a higher temperature is required and more acidity is necessary than when dealing with poor milk, as the fat makes the curd softer and more difficult to drain.

Some cheese-makers use the vertical knife only for cutting the curd, whilst others use both the vertical and horizontal knives. After the curd has been cut slowly and as evenly as possible each way, it is left undisturbed for from 10 to 20 minutes.

It is then cut into smaller pieces or cubes about half an inch in size. Some cheese-makers cut the curd four times, allowing five minutes to elapse between each operation.

The curd is allowed to settle for from about 20 to 30 minutes or even longer if the milk is sweet and there is no danger of the curd becoming too acid. The whey is then removed, which is a process which takes up some considerable time. If a Gornall's Patent Cheese-maker is used when manufacturing the cheese, a cover or cloth is fastened over the opening and the cylinder is turned gradually till the lid is underneath the curd. The cylinder is then turned back and the curd allowed to go down on the opposite side. As soon as the curd is fairly dry, it is then lifted into a drainer. Where the old-fashioned tub is used instead of the Gornall's cheese-maker, the work of removing the whey is more laborious. The whey is lifted out by means of a wooden or tin bowl, pressure being gradually applied to extract the whey. When the wooden tub is on a stand it generally has a tap and a perforated cylinder or perforated partition to prevent the curd from passing through the tap.

After the whey has been drained from the curd, the curd is put into the drainer and allowed to drain for a time before applying pressure.

The common form of drainer is a wooden vat similar to a cheese vat, but with perforated sides. There is a patent drainer press in use which is preferable to the old drainer and cheese press. The curd is placed in a strong cloth when putting it into the drainer, and a follower, which is a shallow and circular piece of wood which fits into the vat, is placed on the curd and pressure is then applied gradually by means of a press.

After the curd has been under pressure for 20 to 30 minutes, allowing a little longer time if the curd is soft and sweet, and a shorter time if it is too ripe and inclined to be stiff, it is taken out of the drainer and is broken up.

It is either broken up with the hands or cut up into large lumps. It is then put back and submitted to further pressure. Care has to be taken not to put too much pressure on to the curd as the outside of the curd is consolidated and the whey cannot escape. The curd when removed from the press should never appear solid, as it indicates that too much pressure has been used.

The curd is cut or broken up from three to five times according to its quality and its condition when put in the drainer. If the drainer is a large one and there is not much curd, it will not need to be broken so often as when there is a large quantity. Curd which is rich wants breaking oftener than when poor. When the curd is dry enough it is then ready for grinding and salting.

At this point the curd should be sweet to the taste, but should have lost the new milk sweetness it had at first. The texture should be short and tender and not too dry and wet. If the curd is too dry the cheese may turn out to be of a weak-flavoured quality, and should the whey be too wet or sloppy—through not removing sufficient whey—it will, when used as old curd, cause the cheese to become sour.

The curd is weighed and a portion is set apart to be used at a subsequent date. A similar quantity of curd will have been set aside one or two days previously, and this is known as the old curd. This old curd will be ground and salted with the new curd.

The old curd has been kept unsalted at a temperature of from 60° to 65° for one or two days whilst the acidity has developed. There is a great deal of difference in the rate of the development of acidity. On some farms the acidity develops quickly, one-day old curd being used, while on other farms it develops slowly and one and two days old curd is used. Sometimes curd which has been kept a few days is used in early spring, autumn, or winter, when it is desired to produce a quick-ripening cheese.

The old curd should be rather sour both to taste and smell, and have a clean and sharp flavour, but should not taste cheesy.

When making a cheese in early spring, autumn, or winter, some makers use two days old, one-day old curd, and new curd.

During the summer when medium ripening cheese is made from one-third to one-half old curd is used for mixing with the new curd.

The old and new curd are mixed together and put twice through a grinding mill so that it may become quite fine. Salt is added at the rate of 1 oz. to 3 to 4 lbs. of curd. The amount of salt required varies on different farms. This is mixed thoroughly at a temperature of not less than 68° and not higher than 72°. If the temperature is higher there is a danger of the butter being melted and run out during pressing, and it is also difficult to get the whey properly out. The temperature of rich curd has to be higher than the poor curd when putting into the cheese vat.

The chief action of the salt is to dry the curd, and should the curd be wet a large quantity of salt may be used and it will draw the whey out. If, however, the curd is dry and a large quantity of salt is used, then it will draw away the moisture and the cheese will be too dry. Rich cheeses require more salt than poor ones. A little extra salt is sometimes used in hot weather or when very little old curd is used, or when the curd is extra sweet. The salt passes off as a liquid, and there is not much fear of having the cheese too salt.

The curd is filled loosely into moulds and then kept in a room at a temperature of 60°. In the evening, the curd is put into cloth and left until morning, unless it is found to be acid when pressure is put on it for the purpose of removing the whey. Some makers do not put any weight on the cheese for six or seven hours after grinding, and if it is extra sweet it is turned so that the bottom portion does not become too salty and acid, and it is left till next morning.

The moulds vary in size, but the following are used: The mould with a diameter of 14 in. is used for a 45 to 50 lbs. cheese; a mould or vat 13 in. in diameter is used for cheese from 35 to 45 lbs.; 12 in. for 30 lbs.; and for a loaf cheese weighing from 12 to 15 lbs., a 7 or 8 in. vat is used.

Pressing.

There is usually a pressure of from 8 to 10 cwts. for one or two hours and then the cheese is turned out into a fresh dry cloth. It is then put back and is submitted to a pressure of from 15 to 20 cwts. for another hour or two until the coat of the cheese is properly formed. The cheese is then turned out and a bandage is put on and it is again returned to the mould with the ends of the cheese reversed, so that the part which was at the bottom during the previous pressing will be uppermost. This is to prevent the cheese from having sharp edges.

The cheese is submitted to further pressure of about 15 cwt. if necessary, but no more pressure is required than will give a good coat and shape.

If the cheese is not straight and the edges right, it is put back into the vat and submitted to further pressure. Small or loaf cheeses are treated in the same way, but the pressure does not exceed 5 cwt.

As soon as the coat of the cheese is dry it is greased with butter, lard, or margarine, which must not have a disagreeable smell, and it is taken to the ripening or curing room. If the first greasing is left too long, the cheese soon gets a greyish appearance. The second greasing is done about two days after the first time, and it is important that the greasing be done uniformly.

The cheeses are turned every day until they are ripe, so as to ensure the even distribution of moisture and even ripening.

Cheese Room.

The room which is used for storing the cheese has to be dry and have a temperature of from 60 to 65°. On a good many farms in Lancashire, the cheese room is unsuitable for keeping cheeses, especially during the summer months.

The room used during summer is on the floor away from any fire or other heat. During autumn and winter the room selected for storing the cheese is immediately over the kitchen. In some farmhouses where I have stayed, I found that the cheese was heated by means of hot-water pipes, but this arrangement is not found in many farmhouses.

The best temperature for ripening cheese is from 58° to 60°. For quick ripening the temperature may be as high as 65°, but if the temperature is allowed to be much higher, the cheeses are likely to ripen too fast.

The quick-ripening cheeses are ripe in from three to five weeks, the medium ripening in from five to eight weeks, and the slow ripening from eight to ten weeks, but the generality of Lancashire cheeses are ripened in about a month's time. In fact in many dairies they are sold off regularly every fortnight to the cheese factors. Fairs are held on the last Tuesday of every month in Preston, and the second Tuesday of every month at Lancaster, and at these fairs a great many cheese-makers sell their cheese at fairly remunerative prices, which compare very favourably with those obtained by producing milk to be despatched by rail.

If cheeses are kept a long time they are apt to lose in weight owing to the evaporation of moisture. It is estimated that a Lancashire cheese loses 10 per cent. of its moisture from the time the curd is weighed and salted until the cheese is ripe. A gallon of milk will produce approximately 1⅛ lb. of cheese on the quick-ripening system, but slightly less on the medium and slow-ripening systems. Of course, these weights vary according to the time of the year, the largest yield being in autumn and winter.

Defects of some Lancashire Cheeses and their Causes.

There are several causes which make some Lancashire cheeses to be of poor quality. If the temperature of the evening's milk is allowed to be lower than 50° Fah. the bacillus *acidi lactici*, which causes the acid in milk, becomes dormant and the butyric acid bacillus begins to grow and causes a disagreeable flavoured cheese, known as binged cheese. Binged or bingey cheese has a disagreeable, hot, peppery taste which commands a much lower price than Lancashire cheese of good quality.

Binged cheese may also be caused through using cracked utensils for the milk which is to be made into cheese, as the cracks harbour the bacillus *butyricus* unless the vessels are properly washed and scalded. Binginess is more common in cheese made during cold than warm weather. There can be no doubt that binged cheese is due to the bacillus *butyricus*, because, on making a bacteriological examination of the cheese, we find a large number of the butyric organism present. Although there may be butyric bacilli present in good cheese they are never present in abundance.

Sour cheeses are caused by either having the curd too acid when being made up or by keeping the curd in too much moisture, and a leaking is also caused by too much acidity and too much moisture. A heaving cheese is caused through having (1) too little acidity, (2) too high a temperature in ripening room, and (3) too little salt.

The Acidity in Lancashire Cheese.

It will be seen that acidity plays a prominent part in the manufacture of Lancashire cheese. The milk at the commencement is a slightly acid liquid, and when kept the acidity increases owing to the growth of the bacillus *acidi lactici.* These lactic acid organisms act on the sugar present in the milk and produce the lactic acid which causes the milk to curdle.

These bacteria grow quickest when the milk is at blood heat, and their power of reproduction is diminished when the temperature is lowered.

Acidity in milk up to a certain point in cheese-making has a similar effect to heat. It helps in the coagulation and drainage and gives firmness to the curd, whilst in the cheese it affects the flavour, texture, and quality.

If the milk which is to be made into cheese is too acid, it is renneted at a lower temperature with more rennet than in usual cases, and the curd is cut as soon as ready into finer cubes than in ordinary circumstances. After the curd has settled, the whey is drawn off, and the curd is put into the drainer and broken up at short intervals into small pieces. Pressure is put on more heavily after each cutting or breaking. The curd is made dryer than usual; although more fat is lost through working so quickly, it is the lesser evil.

When the curd is too dry and also too acid, less old curd is used, and not much salt is mixed with it. The cheese is also pressed earlier than usual. The curd which is kept for the next day is kept as cool as possible.

Treatment of Milk that is too Sweet.

There are three methods adopted in Lancashire of working milk that is too sweet.

1. The milk is renneted at a higher temperature than usual and longer time is allowed for each process in the making of the cheese, and afterwards the old curd is kept warm. (2) The milk is heated to a rather high temperature, and it is held over for a time to ripen before adding rennet. (3) The milk is heated up to a fairly high temperature and allowed to ripen a little when a starter is used, and rennet is added in the usual way.

The last method is best when carried out by a capable person, especially in winter, when it is sometimes difficult to get acidity. When a starter is added the old curd should be watched carefully, as it is liable to vary in acidity. It depends upon the ripeness of the milk and the strength of the starter as to the amount of starter used.

If too much starter is added to the milk too much acidity is produced in the curd, especially in the old curd, and through this the cheese may be spoilt. About 1 oz. of starter is the usual quantity used. Another advantage of the starter is to overcome any taints that are in the milk.

The acidity of the curd when put into the drainer should be ·16 to ·17.

First time of cutting it should be about	...	·19
Second time of cutting it should be about	...	·21
Third time of cutting it should be about	...	·24

When the old and the new curd are mixed the acidity should be approximately about—

Two days old curd	... ...	1·50 %
One day old curd ...	... ...	1·30 %
New curd ...	... ...	·24 %

The acidity of another combination which makes a quick-ripening cheese should be—

Half two days old : acidity	... ...	1·50 %
Half new curd : acidity ...	... ...	·24 %

The acidity of the liquid from Lancashire cheese, when pressed, varied from ·80 to 1·10 per cent.

On some of the farms in Lancashire the cheese-maker determines the acidity by taste and smell, together with the consistency of the curd, but this is not so reliable as when up-to-date instruments and methods are adopted.

There are several tests for ascertaining the acidity during the process of making the cheese. The rennet test is used for testing the milk previous to adding the rennet. It depends upon the condition of the milk as to the influence of the rennet, because the more acid present in the milk the quicker will the milk coagulate.

Four ounces of the milk are taken from the vat which contains the milk to be made into cheese, and is put into a cup, the temperature to be brought to 84° Fah. The time is noted carefully on a stop-watch, and 1 c.c. of rennet, which is of a standard strength, is added, and the mixture stirred for 10 to 12 seconds.

The stirring rod is withdrawn, and the milk is watched carefully for the first indication of coagulation. This is ascertained by dipping the finger into the milk and as soon as a smooth film is formed, the time is reckoned from the time the rennet is put in up to this point. The fewer the seconds the riper the milk. The time taken for a Lancashire cheese should be 24 or 25 seconds.

The Soda Test.

To ascertain the acidity of the milk, whey, or other liquid, the soda test, or acidimeter, is used. A small quantity (10 c.c.) of milk is used and two or three drops of an indicator (·2 per cent. phenol thalien, which turns pink with soda) is added to the milk. A standard solution of soda is allowed to run into the vessel containing the milk from a burette. The burette is graduated, each line representing ·01 per cent., and should the milk require soda filling 20 divisions to produce the pink colour, then the milk contains ·20 per cent. of acid. The soda test is only used on the farms in Lancashire where the cheese-maker has had a technical training.

Hot Iron Test.

This test is commonly used in Lancashire for testing the curd after the moisture has been expelled. A bar of smooth steel is fitted into a handle, and is heated to what is known as a black heat. The heated steel is rubbed to clean it, and then a piece of the curd is pressed firmly, yet gently, against the iron, and is gradually drawn away. If the curd is acid it will at first adhere to the steel, and when drawn off will come out in fine silky threads. The longer and finer the threads, the more acid the curd. If the threads are more than 1½ inches long the curd becomes soft and cheesy and will toast down on the iron. This is detected by the taste and smell and the softness of the curd.

If there is insufficient acid, the curd turns brown and water comes from it. Care has to be taken not to test in a draught. The heat of the iron should be uniform. If it is too hot it will char the curd, and if too cold there will be no discoloration, and the curd will not adhere to it.

The foregoing is a general description of the methods adopted by Lancashire cheese makers in making a cheese which is peculiar to Lancashire. It is gratifying to find that the Lancashire cheese industry is in a much more prosperous position than it was previous to 1906, as will be seen from the following table of the number of cheeses and the prices obtained for the same at the Lancashire Cheese Fair, held on the second Tuesday in February of each year :—

Year.	Dairies.	Cheese.	Price.
1905	44	913	58/- to 70/- per cwt.
1906	42	846	67/- „ 74/- „
1907	17	345	75/- „ 80/- „
1908	38	776	65/- „ 73/- „
1909	30	532	65/- „ 86/- „
1910	55	985	70/- „ 75/- „

Various reasons may be given as to why the cheeses command a higher price than formerly. I believe that a better quality of cheese is being produced owing to the farmers availing themselves of the opportunities offered by the County Council in obtaining the up-to-date information on cheese-making. The use of reliable instruments, such as the thermometer and the acidimeter, is replacing the old guesswork system formerly adopted by the cheese-maker, and modern utensils are being used instead of the antiquated apparatus used in the past. A great deal of cheese is made during the summer when there is less chance of it being tainted by unpleasant odours, and when there is less danger of the milk being allowed to become too low in temperature, which is favourable for the production of butyric acid.

A great many farmers aim at having their cows to calve during early spring, so that they may be ready for the making of cheese during the coming summer. As the animals are dry during the winter,

the farmer is not obliged to purchase a large amount of provender during this time to keep up the milk supply. On a great many farms in Lancashire there is not food grown for the livestock excepting hay, and, as meals and other feeding stuffs are rather dear, the farmers are obliged to study this matter when considering the question of the cost of producing cheese.

One of the greatest drawbacks to the cheese-making industry of Lancashire is, in my opinion, the making of quick-ripening cheese which has to be consumed quickly. If the cheese is ripened quickly it will go rotten quickly, and owing to this disadvantage the maker is obliged to sell them early. If the cheese is made on the slow-ripening principle, it means that the maker may be able to pick his markets, but he has longer to wait before the cheeses are turned into money, and therefore I believe that if the medium-ripening system was adopted generally it would be advantageous to the maker and to the cheese industry of Lancashire.

I am also of opinion that if the farmers made more small cheeses, say from 8 to 12 lbs., instead of from 45 to 50 lbs., they would be able to sell them direct to the consumer at a more remunerative price per lb. than they now obtain for the larger cheeses.

A great deal depends upon cleanliness, skill, and careful attention to details, for the production of a first-class cheese which, like a first-rate horse, will always command customers and a good price, and which to the maker means success in Lancashire cheese making.

ON THE NATURE OF THE CELLULAR ELEMENTS PRESENT IN MILK.

Part II.—Quantitative and Qualitative Results.

(For the British Dairy Farmers' Association)

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In a preliminary report (I.) published last year a summary of conclusions at which we had arrived with regard to the nature of the cellular elements present in milk was set forth. These conclusions were formulated on results obtained during a prolonged quantitative and qualitative examination of these cellular elements in milks obtained from known sources under veterinary supervision, and possess, we believe, a chronological significance which with the exception of results published by Russell and Hoffmann (II.), has been somewhat lacking in many investigations. For this purpose we selected four dairy farms at which milk was being produced for sale on ordinary commercial lines, but under various conditions of environment, both architectural and sanitary. Together with these we were also enabled, through the kindness of Professor Percival, to make use of cows in the experimental herd of the University College of Reading.

Our method was to select six cows, generally a month or so after calving, and after careful veterinary inspection of the animals, to have samples of the carefully mixed milk once a week, until the cows were so near the end of lactation that in the ordinary way their milk would be no longer sold for consumption. As the animals dropped out at varying times we were enabled

concurrently to investigate the effect on the cell count of the end of the lactation period. We were thus also in a position to note what warning might be given of the advent of mastitis when it occurred, and what effect on the mixed milk the inclusion of milk from cows suffering from mastitis might have. The farms being run on commercial lines, we also knew to what extent the milk of cows suffering from mastitis would be included in a general supply, it being the common practice of farmers to include milk as long as it is unchanged in appearance and derived from quarters of the udder not apparently affected by any disease. This practice, though often condemned, is in our opinion probably without danger to the community, except in certain special cases to which we shall refer.

The term "mastitis" includes all forms of inflammatory disease of the mammary gland. It may be interstitial or catarrhal, acute, sub-acute or chronic, localised to a small portion of one quarter of the gland or involving a quarter, quarters or the whole gland. It varies in intensity from a slight, transitory and hardly perceptible condition to one in which there is considerable swelling and thickening, tenderness, local heat, and general constitutional disturbance and fever. Definite suppuration with abscess formation seems to be rare. In a definite catarrhal mastitis the normal secretion is replaced by a yellowish serous fluid.

The slighter forms of so-called mastitis are probably very common and may arise from slight injuries, or even careless milking. The effect on the cell-count, as we believe we show, seems to be as marked in the slight and transitory cases in which the condition is revealed only by a careful examination as in the more severe and obvious cases. We also regard the character of the milk secretion as indicative of the severity of the condition. It must be clearly understood that when the term mastitis is used in this paper, there was never the slightest indication of even a trace of suppuration.

It is to be noted that it is quite common in the early period of lactation for the breasts of the suckling woman to become unequally swollen, knotty and painful. This is ascribed to obstruction in the lacteal ducts preventing a free outflow of the secretion. In the severer cases there may be general constitutional disturbance, thickened lymphatics and enlargement of the axillary glands. The condition almost always ends in resolution. It seems very probable that a similar condition may obtain in the cow and constitute these mild forms of so-called mastitis, especially that termed interstitial mastitis.

We have also investigated in a similar manner the effect of the commencement of lactation, but have been forced to leave the consideration of the effects of feeding, and also of the microscopical structure of the udder tissue itself, to a further report.

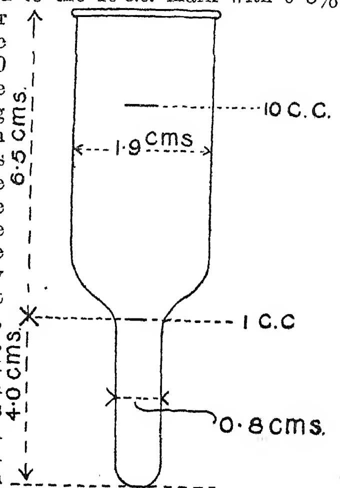
The number of cows selected, viz., six, may at first sight seem too small to represent practical conditions, but in our opinion milk is constantly sold from such a small number, and further, if the number be large, the work becomes unwieldy, and the supervision not sufficiently rigid; and moreover, in such a small herd the inclusion of one abnormal animal would produce a more marked and noticeable effect than if the number of animals were large.

We have attempted to approach our results in a frame of mind unbiassed by prevailing ideas, so that the conclusions at which we have arrived regarding the nature of these cellular elements seem to compel a reconsideration of the causal relationship of streptococci to mastitis, and we hope shortly to make this the subject of experimental investigation.

I. THE QUANTITATIVE EXAMINATION OF MILK FOR CELLULAR ELEMENTS.

For quantitative examination we have adopted a uniform method, which is here described :—

In a tube, of the shape and dimensions shown in the figure, are placed 5 c.c. of the well-mixed milk and diluted to the 10 c.c. mark with 0·8% salt solution. After inserting a rubber stopper the contents are well mixed. The tube is then centrifuged at about 2,000 revs. per minute for two minutes, and the cream then broken up by violently shaking the upper part of the tube and the rotation continued for four minutes longer. A glass rod, fitting roughly the narrow neck of the tube, is inserted and the major part of the milk poured off and the upper part of the tube well rinsed with water to remove cream, &c. ; the contents of the narrow end down to within ¼ inch of the deposit are sucked out with a fine glass pipette, the upper part of the tube wiped clean, and the tube then filled to the 10 c.c. mark with salt solution. The tube having been violently shaken till all the deposit is distributed through the liquid, is then rotated for four minutes and the liquid down to within ¼ inch of the deposit again removed. In the case of small deposits, four to five drops of saturated aqueous solution of methylene blue are added and the deposit stirred up by blowing through a fine glass capillary pipette (which is afterwards used for filling the counting chamber). After 15 minutes, water is added to the 1 c.c. mark and counting done in the usual way with a Thoma-Zeiss blood-counter. Counting should not be restricted to the ruled spaces, but the field so arranged that a definite number of squares is included and fields counted all over the chamber. At least two different preparations should be made of the same deposit for counting.



In the following examinations, the field was so arranged that its diameter was eight small squares of the counter (Leitz-Thoma-Zeiss), then if n be the number of cells per field :—

$$n \times 16{,}000 = \text{number of cells per c.c.}$$

or Savage's method may be adopted (III.).

Early in the investigation our attention was drawn to the work of Russell and Hoffmann (IV.), who have shown that by heating milk to 60°—70° C. for 10 minutes before centrifugalisation, a very great increase in the number of cells takes place, and they attribute this to an effect on the fat globules, which being broken down from their cluster formation by the heat cease to have an entangling effect, which normally results in the carrying of cells to the surface, and a much larger deposit is therefore obtained. This work has been amplified by Campbell (V.), who not only confirms the work of his predecessors, but concurs in their conclusion as to the action of heat. We also concur in the action of heat as an agent increasing the number of cells, but differ as to the explanation.

Before Russell and Hoffmann's work had come into our hands we had found that the addition of about 6 drops of formalin (40% formaldehyde) to 60—70 c.c. of milk had the effect of greatly increasing the number of cells if the milk be allowed to stand 24 hours. We have compared this method with the "heating" method and find that within the limits of error of counting the two methods give very similar results. There is a further advantage in the use of formalin, viz., that this liquid can be introduced into milk the moment it is obtained from the cow, and the sample used after 24 hours without further manipulation, and at the same time the cells themselves are preserved without alteration for microscopical examination.

Now it is evident that there can be no action on the fat globule clusters in this case, such as does occur to a certain extent when milk is heated to 60°—70° C., and we must look for another explanation. One of the most striking effects of formalin or heat is the disruptive action on clusters of the cells themselves, and it would seem more probable that these agents break down aggregations of cells perhaps by destroying some agglutinative property present, and by thus producing a more even distribution of the cells, cause an apparent numerical increase. As a temperature of 70° C. and formalin both have a destructive effect on enzymes and substances of similar nature, this explanation seems reasonable.

The carrying power of the fat globules, not only for cells, but also for blood, bacteria, &c., is undoubted, and it may well be that some attractive force between the fat globules and the cells is also broken down by heat or by formalin.

The formalin method has been used throughout this investigation (with one exception), and this must be taken into account in considering the figures given.

Should the deposit for counting be large, a correspondingly larger amount of methylene blue must be added and the whole diluted to 5, 10 or more c.c., as may be required.

A PRELIMINARY EXPERIMENT TO DETERMINE THE DISTRIBUTION OF CELLS IN THE MILK STREAM.

A number of counts were made of milk drawn from one quarter of a cow in successive portions in order to determine whether these cells appeared uniformly during the process of milking or not. The following are the results obtained :—

	No. of Cells per c.c.	Quantity of Milk.	Fat.	Total Solids.
EXPERIMENT I.				
Fore Milk	17,000	0·3 pint	3·95	13·64
	40,000	0·6 ,,	4·60	14·56
	31,000	0·5 ,,	5·60	15·20
Strippings	32,000	0·5 ,,	6·30	16·01
EXPERIMENT II.				
Fore Milk	155,000	260 c.c.	1·80	11·12
	155,000	300 ,,	2·52	11·80
	165,000	300 ,,	3·20	12·32
Strippings	230,000	170 ,,	4·00	13·02

	No. of Cells per c.c.	Quantity of Milk.	Fat.	Total Solids.
EXPERIMENT III.				
Fore Milk	24,000	150 c.c.	0·80	10·24
	20,000	150 ,,	0·70	10·18
	30,000	170 ,,	0·70	10·16
Strippings	20,000	240 ,,	1·42	10·72
EXPERIMENT IV.				
Fore Milk	30,000	200 ,,	2·22	11·86
	32,500	400 ,,	2·60	12·24
	30,000	450 ,,	2·40	12·03
Strippings	70,000	460 ,,	4·37	13·76
EXPERIMENT V.				
Fore Milk	147,000	160 ,,	1·90	10·48
	137,000	430 ,,	3·00	12·12
	145,000	240 ,,	3·05	12·00
Strippings	290,000	130 ,,	4·45	13·16
EXPERIMENT VI.				
Fore Milk	5,300	330 ,,	0·68	10·44
	4,700	990 ,,	0·55	10·31
	2,200	415 ,,	0·60	10·33
Strippings	1,500	460 ,,	0·62	10·32

From these results it is fairly evident that the cells appear practically uniformly throughout the milking, the slight increase in the strippings being probably caused by increased manipulation of the udder by the milker in stripping. It seems safe to assume that these cells pass into the milk regularly during its elaboration in the alveoli and are not a response to any stimulus given to the tissues by the process of milking. They do not, therefore, appear to be connected with any particular constituent of the milk, but to be the result of the general activity of the gland tissue.

In general, in the case of any particular cow, apart from changes produced by some special causes, the number of cells per c.c. is fairly constant over the lactation period, from which we may infer that these cells are closely connected with milk production, though no light is thus thrown upon their character. As, however, we shall see that in general in the case of cows which are in calf there is a large increase of these cells at the end of lactation, while in the case of cows which are barren no such increase usually takes place, there seems a certain amount of support to the view that these cells are tissue cells, as in the former case we should expect a considerable regenerative action to be taking place in the gland tissue and not in the latter.

DAIRY FARM A.

TO DETERMINE THE EFFECT OF THE INTRODUCTION OF NEWLY CALVED COWS ON THE CELL COUNT OF THE MIXED MILK.

Six cows were selected and at intervals two were dropped out and two newly calved cows introduced in their place. The results were as follow :—

(The counts in this experiment were done without the use of heat or formalin, the numbers are therefore lower than would otherwise have been obtained.)

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Six	17/11/08	670,000	——
Six	25/11/08	287,000	——
Six	1/12/08	278,000	——
Six	9/12/08	384,000	——
Six	17/12/08	261,000	One dropped out and one newly calved in.
Six	18/12/08	287,000	——
Six	23/12/08	705,000	——
Six	31/12/08	230,000	——
Six	6/1/09	—	Two out and two newly calved in.
Six	12/1/09	250,000	——
Six	19/1/09	587,000	——
Six	26/1/09	205,000	——
Six	3/2/09	11,000	——
Six	9/2/09	220,000	——
Six	19/2/09	511,000	Two out and two newly calved in.
Six	24/2/09	272,000	——
Six	30/2/09	220,000	——
Six	8/4/09	572,000	Two out and two newly calved in (one three days only since calving).
Six	13/4/09	237,000	——
Six	20/4/09	697,000	——
Six	28/4/09	412,000	(The two new cows were examined separately, *see below*.)
Six	5/5/09	798,000	——
Six	11/5/09	1,528,000	——

On April 28th, 1909, the milks of the last two cows were separately examined, (1), because the number of cells had increased suddenly the week before and (2), because the milker considered that the milk of one of the cows had become slightly ropy, though there was no evidence of this in the samples received by us.

The results of the examination were as follow :—

Cow I. —28/4/09 1,390,000 cells per c.c.
Cow II.—28/4/09 90,000 cells per c.c.

Analyses :

Cow I.—Total Solids, 12·30%, Fat, 3·50%.
Cow II.—Total Solids, 13·14%, Fat, 4·20%.

The milk of Cow I. was undiminished in quantity and was not in the least abnormal in appearance.

On May 13th this cow (No. I.) was examined by Mr. Villar, who gave the following report :—

"I examined the cow in Kent yesterday. She is a good sort of Shorthorn and had her second calf about six weeks ago.

"I am told that at her first calving she had mastitis affecting the right front quarter of her udder—that quarter is now atrophied and has lost its functional activity, so that we have not been receiving milk from that particular quarter.

"There is a slight sub-acute interstitial mastitis of the right hind quarter, following, I should think, a more acute process.

"The milk from the three quarters had the appearance of normal milk—her afternoon yield was 12 lbs."

The cowman had, however, noticed no signs of inflammation, or abnormality of the udder, which would point to a more acute process.

The milk of this cow was examined several times during the next two months. Except in the case of the first two and the fifth samples, the milk of the two sound quarters was mixed, and that from the suspected (R.H.) quarter milked separately. The milk was also analysed more or less completely, in order to ascertain the effect of the high cell output on the quality.

The results were as follow :—

Date.	No. of Cells per c.c.		Analyses.	
			Fat.	Total Solids.
6/5/09	Mixed milk	5,110,000	3·60	12·18
11/5/09	Mixed milk	5,850,000	3·50	12·06
18/5/09	Two sound quarters ...	2,905,000	3·20	11·87
	R.H. quarter	3,632,000	3·30	12·18
				Lactose (2) 4·62
				Lactose (1) 4·48
21/5/09	Mixed milk...	4,485,000	3·75	12·52
27/5/09	Two quarters	3,700,000	3·45	12·25
	R.H. quarter	10,000,000	3·20	12·10
4/6/09	Two quarters	3,710,000	2·40	11·40
	R.H. quarter	5,125,000	3·25	12·08
				Lactose (1) 4·45
9/6/09	Two quarters	1,656,000	3·30	12·06
	R.H. quarter	3,242,000	3·65	12·60
15/6/09	R.H. quarter	2,995,000	2·95	12·04
17/6/09	Two quarters	2,280,000	3·95	12·87

The cell count, which was at first very much higher in the suspected quarter, gradually fell till the quarters were eliminating cells fairly evenly, though the total count remained very high. There was not, at any time, any abnormal appearance of the udder apparent to the ordinary observer.

Two months later the milk from this cow was again examined :—

23/8/09.—Two quarters	... ...	5,280,000
R.H. quarter	... ...	3,120,000

Analyses of above :

	Fat.	Total Solids.	N.F.S.	Lactose.	Protein and Ash.
Two quarters ...	4·20	13·08	8·88	4·26	4·62
R.H. quarter ...	3·75	12·26	8·51	4·26	4·25

The milk of the two sound quarters now exceeded the so-called affected quarter in cell count. The milk was quite normal chemically, and the high count of cells was not in the case of this cow accompanied with an abnormally depressed percentage of lactose, which as we shall see is often to be observed in such cases. The case of this cow is very interesting, as we have here a cow which has had a slight and transitory affection of one quarter of the udder, producing for a long time a large number of cells from the udder, but without any change in the milk secretion either in quantity or quality, showing that the vital activity of the gland tissue was in no way affected. There is no evidence to show that such milk is injurious, yet if a cell count be relied upon, such milk might at any time have been supposed to be the product of a cow or cows suffering from severe mastitis. Reference will be made to this cow again in our general conclusions.

DAIRY FARM B.

Six cows were selected here and carefully examined. The individual cell counts of these cows at the start, and their dates of calving, were as follow :—

Ref. No. of Cow.	Age.	Last calving.	Cells per c.c.
25	5 years	Feb. 12 1909	14,000
26	6 ,,	Mch. 1 ,,	533,000
27	5 ,,	Jan. 6 ,,	264,000
28	5 ,,	Mch. 7 ,,	75,000
29	4 ,,	Feb. 14 ,,	12,500
30	6 ,,	Mch. 4 ,,	32,500

Their usual feed consisted of a mixture of chaff, grains, flaked maize, bran, bean meal, and half a bushel of mangels a day, and as much hay as they can eat, with about 4 lbs. of linseed and Waterloo cake mixed. The first milk was received on April 7th, 1909, and the samples continued till the cows were dry.

The weekly results were as follow :—

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Six	7/4/09	82,000	—
Six	13/4/09	157,000	—
Six	20/4/09	120,000	—
Six	27/4/09	367,000	—
Six	4/5/09	456,000	Cows turned out to grass after this sample.
Six	11/5/09	115,000	—
Six	18/5/09	256,000	—
Six	25/5/09	142,000	—
Six	1/6/09	315,000	—
Six	8/6/09	161,000	—
Six	15/6/09	667,000	—
Six	22/6/09	329,000	—

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Six	29/6/09	726,000	—
Six	6/7/09	467,000	—
Six	14/7/09	725,000	—
Six	27/7/09	421,000	The cows were examined and found healthy by Mr. Villar, one (27) considered to be far in calf.
Six	4/8/09	458,000	—
Six	7/8/09	—	Individual counts made again with following results:— 25 .. .. .. 35,000 26 .. .. .. 1,410,000 27 .. .. .. 3,545,000 28 .. .. .. 128,000 29 .. .. .. 32,000 30 .. .. .. 100,000 The cows were examined and reported quite healthy, but one quarter (L.F.) of 26 seeming slightly abnormal, she was dropped out after the next sample and her milk was examined separately (*see below*).
Six	11/8/09	770,000	—
Five (25, 27, 28, 29, 30)	18/8/09	1,075,000	—
,,	20/8/09	—	Cow 28 reported to have a bad quarter (L.H.). She was dropped out.
Four (25, 27, 29, 30)	25/8/09	829,000	—
,,	31/8/09	240,000	—
,,	7/9/09	207,000	—
,,	15/9/09	557,000	—
,,	23/9/09	1,210,000	Nothing to account for these fluctuations.
,,	6/10/09	295,000	
,,	12/10/09	1,735,000	
,,	19/10/09	250,000	
,,	20/10/09	—	Cow 27 gave abnormal milk from one quarter. Not diseased, but cow drying off. She was dropped out.
Three (25, 29, 30)	27/10/09	445,000	Higher than last week with cow 27 in.
,,	3/11/09	44,000	—
,,	9/11/09	46,000	—
,,	16/11/09	42,000	Cow 30 dried off.
Two (25, 29)	23/11/09	22,000	—
,,	30/11/09	62,000	—
,,	7/12/09	17,000	—
,,	17/12/09	26,000	—
,,	21/12/09	133,000	—
,,	28/12/09	22,000	—
,,	4/1/10	22,000	Cows dried off.

These cows gave some very remarkable results. In general it must be noted that the end of lactation with the three cows—25, 29 and 30—had no effect at all in raising the cell count, and they were all barren. Cow 27 was a very disturbing factor, and while at no time showing any signs of disease gave very large cell counts towards the end of lactation, and it is evident from the figures obtained between September 15th, 1909, and October 20th, 1909, that this cell count was of a very fluctuating nature. Below are given some further details of this cow.

On August 7th, 1909, there was apparent evidence that cow 26 might be developing mastitis, which however did not occur; the only disturbance being a diminished quantity of milk from her L.F. quarter. On the other hand, cow 28, which on August 7th, 1909, gave no evidence at all of anything wrong, by August 20th, 1909, had developed a severe mastitis in her L.H. quarter, so that the cell count was of no premonitory value and the onset very sudden. A similar case is referred to later.

Further Examination of Cow 26.

This cow was reported on August 7th, 1909, as having a very slight abnormal appearance of the L.F. quarter. It was not sufficient to diagnose any definite disease, but the milk from this quarter was diminished in quantity. Cell counts from each quarter were made as follow:—

Date.	Cells per c.c.	Remarks.
19/8/09—R.H. ..	200,000	All samples quite normal in appearance.
L.H. ..	356,000	
L.F. ..	6,960,000	
R.F. ..	424,000	
25/8/09—R.H. ..	736,000	The quantity of milk from L.F. quarter was still small.
L.H. ..	252,000	
L.F. ..	8,840,000	
R.F. ..	2,292,000	

Analysis of milk of L.F. quarter:—

Fat, 1·27%; total solids, 8·18%; N.F.S., 6·91%; lactose, 2·22% protein and ash, 4·69%.

The milk is only abnormal as regards lactose, a very common occurrence when low solids are found, and generally with a high cell count.

Date.	Cells per c.c.
7/9/09—R.H.	64,000
L.H.	128,000
L.F.	10,640,000
R.F.	372,000

This cow is a very good example of one giving a persistent high cell count with but slight and transitory cause, and her milk was never changed in appearance.

Further Examination of Cow 27.

This cow, on August 7th, 1909, gave a very high count in her mixed milk. She was reported by the veterinary surgeon as drying off rapidly, being far in calf, but she did not become dry till October 20th, 1909, when she dried off with great suddenness, and calved on December 28th, 1909, in a normal manner.

Cell counts and analyses of the milk from each quarter were made, with the following results:—

Date.	No. of Cells.	Remarks.
10/9/09	3,920,000	Mixed milk.
14/9/09—R.H. ..	7,200,000	—
L.H. ..	940,000	—
L.F. ..	6,800,000	—
R.F. ..	2,240,000	—

Analyses.

—	Fat.	Total Solids.	N.F.S.	Lactose.	Protein and Ash.
R.H.	3·15	11·36	8·21	3·64	4·57
L.H.	2·80	11·98	9·18	4·50	4·68
L.F.	3·40	12·20	8·80	3·98	4·82
R.F.	2·40	11·78	9·38	4·58	4·80

The diminished sugars correspond to the high cell counts.

This cow, on October 20th, 1909, gave abnormal fluid from one quarter (R.H.), but not caused by disease. The R.F. and L.F. quarters gave very large deposits, but were not counted. The milk from these three quarters (R.F., L.F. and L.H.) was quite normal in appearance and would have been put in with other milk and undoubtedly have caused a very large cell count in the mixed milk. Each of the fore quarters would have contributed at least 80,000,000 cells per c.c.

The milk of this cow was again examined on January 6th, 1910, nine days after calving, when the number of cells per c.c. was 3,340,000, so that the high cell count continued. The milk of each quarter was examined on January 22nd, 1910, with the following results:—

	No. of Cells per c.c.
R.H.	36,000
L.H.	360,000
L.F.	6,200,000
R.F.	5,200

It will be noted that the high cell count is continued after calving in the L.F. quarter, but in the R.H. has fallen to a very small number. This is a remarkably good instance of the continuity of cell proliferation in quarters which have already given high counts, in spite of the regenerative tissue changes which have presumably taken place.

Cow 28.

This cow developed about August 18th, 1909, a severe catarrhal mastitis of the L.H. quarter. The milk of each quarter was examined on August 23rd, 1909.

L.H.	Yellow watery liquid.
L.F.	452,000
R.F.	282,000
R.H.	1,470,000

It will be observed that the addition of the milk of the unaffected quarters to other milk would not materially affect the total cell count, and therefore give no evidence that milk from a diseased cow had been added.

It is true that the week before this cow developed mastitis the total cell count of the six cows (*q.v.*) rose to over 1,000,000 per c.c., but as this number was exceeded on September 23rd, 1909, and October 12th, 1909, when the mixed milk was from cows not diseased, the indicative value of the cell count is doubtful. From other observations it seems probable that there is no rise in the number of cells in the milk of a cow about to develop mastitis until a day or two before the affection is visible to the eye.

DAIRY FARM C.

(*These cows were not examined by Mr. Villar but by the veterinary surgeon attached to the farm.*)

This farm is used for the production of milk for nursery use, and only high-class tuberculin-tested animals are stalled. The feed is of rather a rich character, including locust and bean meals, &c. The cows are kept in large, first-class sheds, fitted with every up-to-date requirement, and they are under constant veterinary supervision.

The results are extremely interesting, as there was not the least trace of disease at any time in the shed, while the cell counts obtained were often extremely high.

Six cows were selected as usual and carefully examined. They averaged about five years old, and were all Shorthorns. An individual count at the commencement gave the following results :—

Cow.	Date.	No. of Cells per c.c.
1	21/4/09	75,000
2	.. ..	151,000
3	.. ..	14,000
4	.. ..	78,000
5	.. ..	9,500
6	.. ..	70,000

Weekly samples were then taken as usual :—

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Six	5/5/09	322,000	——
Six	12/5/09	136,000	——
Six	18/5/09	295,000	——
Six	26/5/09	635,000	——
Six	2/6/09	478,000	——
Six	9/6/09	303,000	——
Six	16/6/09	563,000	——
Six	23/6/09	343,000	——
Six	30/6/09	357,000	——
Six	7/7/09	385,000	——

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Six	14/7/09	740,000	——
Six	28/7/09	671,000	——
Six	4/8/09	1,186,000	Cows reported quite healthy by veterinary surgeon.
Six	11/8/09	471,000	——
Six	14/8/09	—	Individual counts were made again. Cow. Cells per c.c. 1 .. .. .. 1,745,000 2 .. .. .. 2,300,000 3 .. .. .. 68,000 4 .. .. .. 198,000 5 .. .. .. 462,000 6 .. .. .. 643,000 Cow 3 was drying off and was dropped out here. All were reported quite healthy by the veterinary surgeon.
Five (three dropped out)	18/8/09	817,000	Cow 6 stated to be giving very slightly less milk from one quarter. (L.H.) The milk of Cow 6 was examined (see below). The veterinary surgeon reported as follows:— "Has a slight thickening in the near hind quarter of udder. Temp. 102·2, pulse normal. She is quite healthy." N.B.—This thickening referred to disappeared practically entirely before the end of lactation. The lessened quantity of milk was only ephemeral, as eight days later each quarter was giving practically the same quantity when actually measured. Cows 1 and 2 were reported quite healthy.
Five ..	25/8/09	640,000	Including Cow 6, which had recovered her quantity in L.H. quarter.
Five ..	31/8/09	1,678,000	——
Five ..	8/9/09	1,450,000	——
Five ..	15/9/09	1,070,000	——
Five ..	23/9/09	660,000	——
Five ..	29/9/09	815,000	——
Five ..	7/10/09	1,580,000	——
Five ..	13/10/09	1,635,000	——
Five ..	20/10/09	650,000	——
Five ..	27/10/09	669,000	Cow 1 dropped out here.
Four ..	4/11/09	1,680,000	——
Four ..	10/11/09	330,000	——
Four ..	16/11/09	786,000	——

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
Four ..	24/11/09	1,020,000	——
Four ..	1/12/09	4,255,000	Cows reported quite healthy.
Four ..	3/12/09	—	Individual counts were again made, with the following results :— Cow. — Cells per c.c. 2 .. .. .. 3,900,000 4 .. .. .. 644,000 6 .. .. .. 1,000,000 7 .. .. .. 460,000 Cow 2 was very carefully examined and was found perfectly healthy in every way. Cow 6 is still contributing a high cell count. The cows are, of course, nearing the end of lactation, but still milking well.
Four ..	8/12/09	778,000	Note the drop in the cell count.
Four ..	15/12/09	981,000	——
Four ..	21/12/09	519,000	——
Four ..	29/12/09	985,000	——
Four ..	5/1/10	1,982,000	——

Special Examination of Milk of Cow 6.

The milk of this cow was carefully examined on several occasions and also analysed with the following results :—

Date.	No. of Cells per c.c.
19/8/09—R.H.	7,210,000
L.H.	540,000
L.F.	112,000
R.F.	84,000

Analysis.

—	Fat.	Total Solids.	N.F.S.	Sugar.	Protein and Ash.
R.H.	2·10	10·80	8·70	4·3	4·4
L.H.	1·50	9·90	8·40	4·1	4·3
L.F.	2·25	10·66	8·41	4·2	4·2
R.F.	2·85	11·44	8·59	4·2	4·4

None of this milk at all abnormal in appearance.

Date.	No. of Cells per c.c.
26/8/09—R.H.	5,360,000
L.H.	372,000
L.F.	120,000
R.F.	136,000
10/9/09—R.H.	1,940,000
L.H.	1,040,000
L.F.	318,000
R.F.	152,000
29/10/09—R.H.	1,320,000
L.H.	256,000
L.F.	600,000
R.F.	300,000
18/1/10—R.H.	920,000
(3 months L.H.	1,496,000
later.) L.F.	1,800,000
R.F.	2,680,000

The results here are very curious as the R.F. quarter now gives the high count. The cow is nearly dry.

The milk of this cow is most interesting, as it is a good example of very high cell counts without satisfactory cause. The veterinary surgeon could give no explanation of the slight thickening of the one quarter, and there was no evidence at all of any diseased condition. There is no doubt that this cow gave fluctuating, and often very high, counts from the R.H. quarter, and was responsible for the high count experienced at times in the mixed milk, though there is no doubt that Cow 2 also contributed heavily at times. This cow was slaughtered on February 14th, 1910, and portions of the udder used for microscopical examination, the results of which will appear in a subsequent report.

FURTHER EXAMINATION OF MILK OF COW 2.

Date.	No. of Cells per c.c.
6/12/09—R.H.	1,112,000
L.H.	21,200,000
L.F.	776,000
R.F.	2,800,000
10/12/09—L.H.	3,880,000

Analysis of Milk from L.H. quarter.

Fat	3·35
Total solids	12·22
N.F.S.	8·87
Lactose	3·82
Protein and ash	5·05

Note high protein and low sugar as usual with the high cell count.

Date.	No. of Cells per c.c.
31/12/09—R.H.	212,000
L.H.	352,000
L.F.	616,000
R.F.	500,000

The milk of this cow was not diminished at any time, nor did the udder at any time present any abnormal appearance, nor could the least hardening be detected. There was no doubt that she was in perfect health. It will be noted that on December 31st, 1909, the milk showed a fairly normal cell count from each quarter.

Milk of Cow 3, analysed August 23rd, 1909, when nearly dry.

Fat	4·00
Total solids	13·83
N.F.S.	9·83
Lactose	4·08
Protein and ash	5·75

The protein and ash are abnormally high, but the milk was quite normal in appearance and taste.

There was no particular reason for examining this milk, as the cow was, on August 14th, 1909, giving only a small cell count, but it is interesting from the fact that the composition is practically the same as that from udders giving high cell counts.

DAIRY FARM D.

To determine the effect of Calving on the Cell Content of the Milk.

For this purpose cows were selected which had calved from one week to a fortnight before the samples were taken. We were not concerned with the actual immediate effect of parturition, but only with any effect that might be produced in milk sold for consumption, for which purpose an interval of about a week is usually allowed. The following method was adopted:—

Starting with one cow, samples were taken weekly from her, till another newly-calved cow was available, when the mixed milk of these two was examined, and so on, till six newly-calved cows had been brought into use.

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
One (33) ..	26/10/09	339,000	—
One (34) ..	3/11/09	110,000	Contained a trace of blood.
Two (33, 34) ..	4/11/09	279,000	Contained a trace of blood.
One (35) ..	10/11/09	36,000	
Three (33, 34, 35)	10/11/09	138,000	—
One (36) ..	17/11/09	415,000	
Four (33, 34, 35, 36)	17/11/09	3,290,000	—
	22/11/09	—	The cows were examined separately, with the following results:— No. of Cow. Cells per c.c. 33 .. .. .. 352,000 34 .. .. .. 56,000 35 .. .. .. 136,000 36 .. .. .. 1,760,000 (See below.)
One (38) ..	24/11/09	99,000	
Five (33, 34, 35, 36, 38)	24/11/09	483,000	—
	26/11/09	—	Cow 34 suffering from severe catarrhal mastitis in L.H. quarter. She was dropped out. Cow 36 had a circumscribed swelling on R.H. quarter, but milk not affected.

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
One (37) ..	1/12/09	4,360,000	
Five (33, 35, 36, 37, 38)	1/12/09	1,295,000	—
	3/12/09	—	Cow 37 was carefully examined. Mr. Villar reported:— "She is a Shorthorn of good class and had calved 11 days, was giving 16 quarts of milk per day and appears in very good health, but her temperature was one degree above normal. "She has what is known as a 'fleshy udder'—this is quite a normal condition, but in this cow there is an abnormality of R.H. quarter, viz., it is slightly larger and the least bit more firm to the feel than the corresponding quarter—there is no pain or increased local temperature. Milk from it appears normal in quality and quantity. The condition is not observable, except on very careful examination." The cowman stated that "she ran her milk" in the morning from the L.H. quarter. She was giving full normal milk from *all* quarters.
One 34A (instead of old 34)	8/12/09	730,000	
Six (33, 34A, 35, 36, 37, 38)	8/12/09	885,000	—
,, ,,	15/12/09	1,073,000	—
,, ,,	22/12/09	1,174,000	—
	24/12/09	—	Mr. Villar examined 36 and 37 and reported as follows:— "*Cow No.* 37.—The R.H. is now quite normal, but the L.H. quarter is obviously swollen throughout; the milk appears normal and the quantity from this quarter does not differ from that given from the other quarters, but there was at this afternoon's meal (24th inst.) a considerable *total* falling off from that at my previous visit. The cow's temperature was

No. of Cows.	Date.	No. of Cells per c.c.	Remarks.
			102·6, and she has fallen away in condition and her appetite is not very good. I should regard it as a non-specific interstitial mastitis. "*Cow No.* 36 had also a marked local mastitis at the upper posterior part of the R.H. quarter—there is no external sign of injury, although the symptoms rather suggested that cause. It was semi-acute, and may go on to suppuration. The milk was not altered in appearance, and did not appear to be in quantity either from this quarter—cow in herself quite well—no sign of tuberculosis. I do not think that the actual secreting tissue is affected by the swelling."
Six (33, 34A, 35, 36, 37, 38)	29/12/09	558,000	—
,, ,, (but not including milk from L.H. of 37)	5/1/09	1,364,000	—

As sufficient samples had been examined, this supply was not continued further.

The interpretation of the above results is very difficult, as it is much complicated by the appearance of mastitis, or other udder affection in the cows. Some points, however, are very noteworthy.

The original Cow 34 is the only one which developed a typical catarrhal mastitis, and it is to be noted that she gave *no* premonitory symptoms as regards alteration in the count. On November 17th, 1909, the very large count rather pointed to some such trouble, but on November 22nd, 1909, the cell count of this cow was only 56,000. Two days later she had a severe mastitis of the L.H. quarter, from which milk ceased, and was replaced by the usual yellowish watery fluid. The veterinary surgeon reported that it was of some days standing probably, but two days previously there was no evidence of the disease, as indicated by the cell count.

On November 30th, 1909, each quarter was examined with the following results:—

R.H.	64,000
L.H.	yellow watery fluid.
L.F.	100,000
R.F.	20,000

The noteworthy point here is the low cell counts in the unaffected quarters. This is of very great importance, as *in practice the farmer would milk the L.H. quarter on the ground and mix the milk of the other quarters with other milk,* and there would not be the least indication that the milk was not from a healthy cow. The inadequacy of cell counts to detect or foreshadow mastitis in certain cases is well exemplified in the case of this cow.

She did not develop any disease of these other three quarters within the time of our experiment.

Cow 37.

The milk of all four quarters of this cow was examined on December 13th 1909, with the following results:—

R.H.	73,000,000
L.H.	(sample broken.)
L.F.	11,240,000
R.F.	1,800,000

The milk was quite normal in appearance from all the quarters examined, but the deposit from the R.H. quarter contained quantities of long chain streptococci. Some of this deposit was injected into a young rabbit, but no ill effects at all followed.

On December 17th, 1909, the milk from these four quarters was analysed:

	Fat.	Total Solids.	N.F.S.	Lactose.	Protein & Ash.
R.H.	3·55	11·64	8·09	2·98	5·11
L.H.	3·90	12·62	8·72	4·74	3·98
L.F.	3·90	12·76	8·86	4·95	3·91
R.F.	3·25	12·14	8·89	5·01	3·88

All these milks were quite normal in appearance, and the low sugar in the case of the R.H. quarter, which gave such a heavy cell count is again to be noted. Here it is accompanied by a rise in protein.

Seven days later this R.H. quarter was quite normal, (in fact, it had only been slightly abnormal in appearance from the first), but the L.H. quarter was now swollen as noted above, and on December 30th, 1909, a sample of milk from each quarter was again examined:—

	Cells per c.c.
R.H.	84,000,000
L.H.	79,000,000
L.F.	684,000
R.F.	1,148,000

The milks were all quite normal in appearance, but the deposits both from the L.H. and R.H. quarters contained numbers of long chain streptococci.

The milk was again examined on January 20th, 1910:—

		cells per c.c.
R.H. Uncountable	approximately	100,000,000
L.H. Uncountable	approximately	100,000,000
L.F.		6 440,000
R.F.		2,820,000

The deposit from the R.H. and L.H. quarters was full of streptococci in thick masses. The same organisms were also present in the two fore quarters. A large amount of deposit from the milk of each of the two hind quarters was injected into two young rabbits. In both cases no ill effects resulted. It is to be particularly noted that she ran her milk from both hind quarters because if the sphincter muscle was not sufficiently strong to stop the egress of milk, it could not stop the ingress of streptococci.

The milk of the four quarters was analysed on January 27th, 1910, with the following results :—

	Total Solids.	Fat.	N.F.S.	Lactose.	Protein & Ash.
R.H.	9·76	2·40	7·36	2·18	5·18
L.H.	10·41	2·80	7·61	2·82	4·79
L.F.	13·40	4·30	9·10	4·42	4·68
R.F.	11·72	2·55	9·17	5·00	4·17

In the R.H. and L.H. quarters the lactose is much depressed and protein high. The milk of the hind quarters was very slightly brownish, but only noticeable in comparison with other milk. Mr. Villar, on January 19th, 1910, reported as follows :—

"Cow No. 37.—R.H. quarter, normal. L.H. quarter mastitis slightly more marked than at my previous visit, quarter somewhat harder, but not any larger, first milk drawn flaky, and I thought slightly more yellow than normal, but the milker made use of it in the ordinary way. Cow's temperature two degrees above normal; she coughed, and obviously not a healthy cow."

On February 19th, 1910, Mr. Villar reported that this cow was much better in every way. She was killed on March 11th, 1910, and the results of the microscopical examination of the udder will appear in a subsequent report.

Cow 36.

The veterinary reports on this cow are given above. Counts of the cells from all four quarters were made on January 31st, 1910, with the following results :—

R.H.	12,400,000
L.H.	1,942,000
L.F.	172,000
R.F.	660,000

No streptococci were apparently present, and these milks were quite normal in appearance.

The chemical analyses of the milk on January 1st, 1910, were as follow :—

	Fat.	Total Solids.	N.F.S.	Lactose.	Protein & Ash.
R.H.	3·35	12·08	8·73	4·74	3·99
L.H.	3·50	11·74	8·24	4·15	4·09
L.F.	3·50	12·81	9·31	4·78	4·53
R.F.	3·15	11·91	8·76	4·82	3·94

All were quite normal in appearance and the quarter (R.H.) which shows the high cell count in this case does not show a depressed lactose figure, which curiously enough is found in the L.H. quarter which is not in any way affected.

The milk was again examined on January 20th, 1910, with the following results :—

R.H.	336,000
L.H.	1,560,000
L.F.	68,000
R.F.	168,000

Mr. Villar reported as follows :—" The swelling is more diffused, assuming a chronic character and is extending into the mammary tissue."

This is most interesting as the lesion is becoming worse, and yet the cell count has fallen off considerably, and the quarter giving the highest count is the one not affected.

The milk of each quarter was analysed on January 26th, 1910, with the following results :—

	Total Solids.	Fat.	N.F.S.	Lactose.	Protein & Ash.
R.H.	13·62	4·80	8·82	4·60	4·22
L.H.	12·18	3·75	8·43	4·23	4·20
L.F.	12·80	3·70	9·10	4·97	4·13
R.F.	12·34	3·70	8·64	—	—

All were quite normal in appearance. Here in the L.H. quarter, which now gives the highest cell count, the sugar is still depressed, but protein is normal.

EXPERIMENTAL HERD.

Six cows of the experimental herd of the Reading University College Farm at Shinfield were selected and samples received weekly from these cows as in the other cases.

These cows calved as follows :—

No. 19	March 19th, 1909.
No. 17	March 1st, 1909.
No. 16	February 1st, 1909.
No. 11	December 20th, 1908.
No. 9	November 3rd, 1908.
No. 14	May 24th, 1909.

The first sample of milk was received on June 30th, 1909.

The following are the results obtained :—

No. of Cows.	Date.	No. of Cells per cc..	Remarks.
Six	30/6/09	67,000	—
Six	7/7/09	88,000	—
Six	14/7/09	126,000	—
Six	28/7/09	70,000	—
Six	4/8/09	67,000	—
Six	11/8/09	200,000	—
Six	18/8/09	184,000	—

No. of Cows.	Date.	No. of Cells per cc.	Remarks,
Six	25/8/09	304,000	——
Six	31/8/09	161,000	——
Six	7/9/09	212,000	——
Six	15/9/09	830,000	Sudden heavy feed of green maize—no illness.
Six	23/9/09	195,000	——
Six	29/9/09	189,000	——
Six	6/10/09	359,000	——
Six	13/10/09	165,000	——
Six	19/10/09	228,000	——
Five ..	26/10/09	188,000	
Five ..	4/11/09	180,000	——
Five ..	9/11/09	200,000	——
Five ..	16/11/09	248,000	——
Five ..	23/11/09	310,000	——
Three ..	30/11/09	126,000	——
Three ..	7/12/09	137,000	——
Three ..	14/12/09	139,000	——
Two ..	28/12/09	173,000	——
Two ..	4/1/10	287,000	——
Two ..	11/1/10	183,000	——
Two ..	18/1/10	1,258,000	No disease.
Two ..	25/1/10	1,015,000	——

Except for the incident of the heavy feed with maize, the cell count of these cows pursued a remarkably steady course. No illness beyond indigestion appeared at any time, and even this latter had no effect on the cell count.

The milk of this herd is hardly comparable with that of ordinary dairy farming, but it is very interesting in that it shows that rest and regular habits may have a good deal to do with keeping a steady low cell count.

The last two cows which at the end showed an increased cell count were nearly dry, and both were in calf. The increased count is therefore to be expected, *cf.* the last cows of Dairy Farm B., where the cows were barren.

THE EFFECT OF TUBERCULIN INJECTIONS ON CELL COUNT.

In two cases milk was received from cows which were tested with tuberculin. The samples were taken 24 hours before the injection and three days after, with the following results:—

Time.	No. of Cells.
I.—24 hours previous	95,000
3 days after	87,000
II.—24 hours previous	251,000
3 days after	241,000

It is evident that injections of tuberculin do not cause an increase in the number of cells.

GENERAL SUMMARY OF THE FOREGOING QUANTITATIVE EXAMINATIONS.

In the following table are given some of the counts obtained from mixed milks of cows, either all healthy, or some healthy and some abnormal, in order that they may be easily compared:—

Healthy Cows.		Healthy and Abnormal Cows.	
No. of Cows.	Cells per c.c.	No. of Cows.	Cells per c.c.
Six	726,000	Five	483,000
Five	817,000	*Six	885,000
Four	829,000	*Six	1,073,000
Five	1,070,000	Five	1,075,000
Six	1,186,000	*Six	1,174,000
Four	1,210,000	*Five	1,295,000
Five	1,450,000	*Six	1,364,000
Five	1,580,000	*Four	3,290,000
Five	1,678,000		
Five	1,638,000		
Four	1,735,000		
Four	4,255,000		

* These contained the milk of two abnormal cows, the other samples only one.

The above figures show conclusively how little reliance can be placed on a count of the cellular elements as an indication of the presence of udder disease, even in such small numbers of cows as were here employed. Attention has already been drawn to the fact that in cases of catarrhal mastitis, there is often no warning given in the way of increased cell count until the actual onset of the disease.

A comparative study of the cows whose milk was examined separately on several occasions because a high cell count had occurred leads to some interesting results:—

Of the two cows which actually developed a typical catarrhal mastitis, viz., Cow 34 (Farm D.) and Cow 28 (Farm B.), it is to be noted that in both cases, in the unattacked quarters, low cell counts were found on the occasions recorded, viz., soon after the onset. It is true that the cell count usually increases in the other quarters gradually, and particularly if they also succumb to the disease, but in neither of these cases was there any further obvious spread of the lesion. As we have already pointed out the cell count gives no indication of the state of affairs.

Cow 37 (Farm D.) provides a very interesting study. There was undoubtedly considerable disturbance in the udder of the cow progressively involving nearly all four quarters, but particularly the two hind quarters. This disturbance could not be described as acute or suppurative mastitis. The chemical analysis showed the milk to be but slightly altered, and then only in such a way as we have always found when the cell content is increased from any cause. The milk was certainly slightly slimy, due undoubtedly to the large cell content, and on some occasions it was stated to be slightly discoloured and abnormal in odour, but this did not come under our own observation. The whole condition of the udder, indeed, suggests that there was a want of tone and lowered vitality of that organ, and that the abundance

of streptococci might have been a sequel rather than a cause of the condition. It must not be forgotten that she "ran her milk." The milk of this cow though laden with streptococci was sold, and used locally. We had sufficient faith in our view of the case not to hinder the sale of this milk. The presence of her milk might have been detected in a mixed milk, as the cell counts were often very high, but the diagnosis of any danger to the consumer is, in our opinion, doubtful. This opinion is further supported by some very recent experiments made by Savage (VII.) for the Local Government Board in connection with his "Goat Test" for the differentiation of streptococci. The experiments seem to show very conclusively that sore throat in human beings is not caused by the streptococci found in bovine mastitis. Savage went so far as to test the truth of this conclusion by personal inoculations with such streptococci, from which no harm whatever resulted.

Of the effect of what may be taken as external agencies, Cow 36 (Farm D.) and Cow 6 (Farm C.) provide good instances. In the case of the former the stimulus took the form of a circumscribed superficial semi-acute inflammatory process, which during the course of our observation slowly spread. It is doubtful whether the actual secreting tissue was involved, but an increased cell count followed. The same result was observed in the case of the other cow, but here the nature of the lesion is exceedingly doubtful. It was probably caused in the first instance by a slight blow, though no diminution of milk followed. When the cow was killed on February 14th, 1910, all trace of the thickening had gone. A similar case is reported by Hastings and Hoffmann (VI.). The persistent effect of this hardening, even though it was rapidly disappearing in the case of our own cow, is remarkable.

The case of Cow 1 (Farm A.) also shows in a very clear manner the long persistence of cell proliferation after a slight and transitory udder trouble. In this case, too, the lesion was scarcely such as to give any reason to suppose that the milk would be unhealthy; yet, to the end of the lactation period the response to the early stimulus was maintained almost unimpaired. It must of course be remarked that cows which have already lost a quarter through mastitis are well known to be liable to a recurrence of the trouble, and it may be suggested that the activity produced in the germinal and epithelial layers by the first attack lessens their resistance to other attacks, perhaps on account of the continuity of the epithelial layer being constantly disturbed by the elimination and replacement of its units. Such a lessened resistance and liability to recurrence is, of course, well known in connection with various inflammatory lesions.

In Cow 2 (Farm C.) and Cow 27 (Farm B.), and possibly also Cow 26 of the same farm, we have instances of high cell counts, often prolonged, without any reason that it was possible to discover. To say that the cell count pre-supposes the disease is simply a *circulus in probando*. Cow "Dorine" mentioned by Hastings and Hoffmann (*loc. cit*) is a similar case.

The general impression that is forced on the investigator into this question after prolonged study, is the hopelessness of arriving at any really satisfactory explanation of phenomena such as we have detected. The udder is evidently an organ so open to stimuli of a most varied nature, and yet showing practically only one form of response to such stimuli, that the cause is not to be diagnosed from the effect produced.

The idea so often held, that the cow is a stolid unimpressionable animal is quite erroneous. She shows all the response to outside influences that the human subject does. Cows are extremely nervous and often show profound changes in their milk when the usual surroundings or methods are changed, or if they are harrassed or excited in any way. The effect may be transitory, but it is none the less real. The wonderful power which a cow can exercise

over the udder, such as retention of the milk when a new milker or unusual method of milking is employed is quite well known to any who have had to deal with cows.

We are of the opinion that the cytological examination of milk does not admit of any inference of the existence of a diseased condition of the cows supplying the milk. It may point to the desirability of veterinary inspection, but gives no "a priori" grounds for condemnation of the milk.

II. THE NATURE OF THE CELLULAR ELEMENTS PRESENT IN MILK.

The question of the nature of the cells has been investigated in the course of the work done on the number of these elements present in the samples of milk examined. From the deposit obtained by centrifugalising as detailed below, stained films have been prepared by the following method, and a large number of preparations have been studied. The method of preparation of the stained films is as follows:—

"Five c.c. of the milk which has been exposed to the action of formalin for 24 hours (see above), are diluted with five c.c. of physiological (0·8%) salt solution, rotated sufficiently and all the supernatant liquid is then removed. (The cream is entirely washed away as in the case of obtaining deposits for counting.) The deposit is diluted to 10 c.c. with distilled water shaken up and again rotated, the supernatant liquid removed and the deposit mixed up with sufficient distilled water by blowing through a fine glass pipette. One c.c. of water is usually sufficient dilution, but if the deposit be large a proportionately larger quantity of water is required. The diluted deposit is distributed over two perfectly clean cover slips set on a level table, a cover being suspended over them to prevent the ingress of dust; they are allowed to dry by evaporation. They are then placed in alcohol-ether (1 : 1) for 30 minutes, allowed to dry and stained as under:—

STAIN.—Modified Geimsa.

Azur II. Eosin	3·0 grammes
Azur II.	1·6 grammes.
Glycerin (Kahlbaum)	250 grammes.
Methyl Alcohol (Kahlbaum)	250 grammes.

The dry stains must be left in a desiccator for 48 hours before use. For use, place three to four drops of this stain in a large weighing bottle (2 inches high by 1½ inches in diameter) and add 1 c.c. of water. Mix well and add 1 c.c. pure methyl alcohol. The films prepared as above are placed face upwards at the bottom (one in each bottle) and left for 48 to 72 hours. At the end of this time there is added 2 c.c. of dilute solution of Acetic Acid (Kahlbaum's absolute) 1·5 parts per 100,000, mixing well. After four minutes pour off the stain and wash the film well for 30 to 40 seconds with distilled water by irrigation.

Dry and mount in Canada balsam. The time of action of the acetic acid may require modification in the case of individual observers. It must be allowed to act sufficiently long to cause the cytoplasm to stain pink and yet leave the nuclei a deep blue.

This method gives films in which the various cells on the whole are well stained and well differentiated. It is much superior to specimens prepared with methylene blue, borax methylene blue and eosin, thionine blue, or with the Leishman stain.

A few films have also been stained with hæmatoxylin and eosin after fixing: this also gives satisfactory specimens. From a study of a large number of films prepared in this way cells having the following characters may be distinguished,

(1) Cells having a large single nucleus (*large uni-nucleated* cells*).

These are roundish cells 9 to 12 μ in diameter, each containing a single nucleus, which occupies about half the cell. The nucleus is roundish, or sometimes elongated or semilunar in form, generally excentric, often quite on one side of the cell and then frequently semilunar in shape. The border of the nucleus is slightly ragged, the nucleo-plasm stains deeply of a hæmatoxylin-blue colour, but not uniformly, shewing lighter and darker irregularly-shaped portions.

The cytoplasm is structureless and stains well with the eosin. (In a few of these cells a double adjacent nucleus is present as though division of the nucleus had just occurred.) In many specimens this type is the predominant cell present.

Frequently, naked nuclei, resembling the nucleus above described, are present. Cells apparently of this type are also met with, but in which the cytoplasm and nucleus are vacuolated and striated, so that no clear picture of the cell can be obtained. These are probably degenerate forms, or may have contained fat-droplets.

This large uni-nucleated cell is regarded as an epithelial cell derived from the secreting layer of the gland tissue. In the figures attached to Winkler's paper (*loc. cit.*) cells with semi-lunar marginal nulcei are here and there depicted. Winkler also mentions the occurrence of naked nuclei. (VIII.)

(2) Cells having two or more small nuclei (*multi-nucleated cells*).

These are roundish cells, smaller than the preceding, being above 8 to 10 μ in diameter. Each has two to four, occasionally five, small, generally roundish, occasionally irregular, nuclei, staining deeply and uniformly of a deep hæmatoxylin-blue colour. The nuclei may be separate, scattered, or clustered, and are sometimes arranged in a crescent or horse-shoe.

The cytoplasm is structureless and stains well with the eosin.

Similar cells are also present, but the nuclei of which stain a pale Cambridge blue. The two kinds are probably identical, the latter being perhaps degenerated.

If the nuclei are arranged crescentrically, or in a horse-shoe, these cells bear some resemblance to polymorphonuclear leucocytes, particularly if badly stained. When properly stained, however, there can be no question that they are *not* polymorphonuclear leucocytes.

These cells are sometimes almost absent, sometimes they are numerous, sometimes abundant.

There can be little doubt that these are the "germinal cells" described by Winkler.

(3) Cells with a small single nucleus (*small uni-nucleated cells*).

These are roundish cells, 7 to 9 μ in diameter. The nucleus is small with sharp edges, roundish, and stains uniformly and deeply of a hæmatoxylin-blue colour. The cytoplasm is structureless and stains well with the eosin, sometimes deeply, in which case the cell resembles a normoblast ("normoblastic" type). In some of these cells which stain deeply with eosin, the nucleus stains a Cambridge blue. These cells are generally scanty in numbers.

*The prefixes "uni" "and multi" have been adopted in describing the cells, to avoid any possibility of confusing them with the "mono" and "poly" nuclears of the blood.

(4) Cells with eosinophilic granules (*eosinophile cells*).

These are roundish cells, 7 to 9 μ in diameter. The nucleus is lobed or horse-shoe shaped and stains a Cambridge blue. The cytoplasm is filled with finish eosinophilic granules.

These cells are always scanty in numbers, or frequently absent.

(5) Vacuolated cells.

Cells of some size (10 to 15 μ) without, or with a faint staining, large, single nucleus. The cytoplasm stains feebly and appears to be vacuolated. These cells are probably fat-bearing cells, cells which have undergone fatty degeneration, or cells allied to colostrum corpuscles.

They are generally present in small numbers in all specimens.

(6) *Cells of indeterminate nature.*

A certain proportion of cells is generally present in all specimens which are indefinite in character, owing to feeble staining of cytoplasm and nucleus, giving them a hazy appearance, and cannot be classified under the above headings. An occasional lymphocyte-like cell is seen, also squamous cells.

Cells also occur which cannot be definitely classified under the above heads and may have characters intermediate between the cells of one and another class. It would serve no useful purpose, though it might be done, to make groups to include these cells, and in the descriptions of the specimens which follow a general survey of each film has been made and the general nature of the cells present is summarised.

The outstanding feature in the examination of some hundred films prepared both from normal cows at different periods of lactation and from cows in mastitis and representing many thousands of cells is, "that *no cell having any decided resemblance to a polymorphonuclear leucocyte has been detected*," and phagocytosis of bacteria present is conspicuous by its absence.

We are not prepared at the present time to refer the cells other than those included under the headings 1 and 2 to any particular tissues of the udder until our investigation on the histology of the udder is completed, when reference will be again made to them.

GENERAL DESCRIPTION OF CELLS FOUND ON MICROSCOPICAL EXAMINATION OF STAINED FILMS OF MILK DEPOSITS.

MIXED MILK OF SIX HEALTHY COWS.

Farm B.

No.	Date.	Cells Present.
I.	7/4/09	Mostly of the large uni-nuclear type with rounded nuclei; some with divided nucleus. An occasional multi-nuclear and small uni-nuclear.
II.	14/4/09	Mostly of the large uni-nuclear type. The staining in this specimen is somewhat hazy and indefinite.
III.	21/4/09	Almost entirely of the large uni-nuclear type, mostly with rounded, a few with semi-lunar or horse-shoe, nucleus. A few small uni-nuclears of the normoblastic type also present.

No.	Date.	Cells Present.
IV.	28/4/09	Almost entirely of the large uni-nuclear type, mostly with rounded, a few with horse-shoe, nuclei.
V.	5/5/09	Almost entirely of the large uni-nuclear type with rounded nuclei.
VI.	11/5/09	Mostly of the large uni-nuclear type with rounded nuclei. A few small uni-nuclears.
VII.	8/6/09	Mixture of cells of large uni-nuclear with some of the multi-nuclear types. (Hæmatoxylin and eosin staining.)
VIII.	15/6/09	Mostly of the large uni-nuclear type, both with rounded and with semi-lunar nuclei. Some small uni-nuclear cells.
IX.	24/6/09	Same as VIII.
X.	7/7/09	Majority of cells are large uni-nuclears with some multi-nuclears and a few small uni-nuclears.
		EXPERIMENTAL HERD.
XI.	7/7/09	Mostly multi-nuclears with relatively numerous small uni-nuclears. Some vacuolated cells. Hardly any large uni-nuclears.
XII.	18/8/09	Much the same as XI.
		FARM C.
XIII.	28/4/09	Mostly large uni-nuclear cells with rounded nuclei, some with divided nuclei, with a few multi-nuclear cells.
XIV.	11/5/09	Same as XIII.
XV.	8/6/09	Large uni-nuclears with some multi-nuclears and a few small uni-nuclears.
XVI.	24/6/09	Mostly large uni-nuclears with a few multi-nuclears, an occasional small uni-nuclear and here and there an eosinophile.

MILK OF NEWLY-CALVED COWS.

FARM D.

No.	Date.	Nature of Slide.	Cells Present.
I.	26/10/09	Cow 33 (cow remained healthy).	Almost entirely of large uni-nuclear type with rounded nuclei. Some vacuolated cells.
II.	3/11/09	Cow 34 (developed severe mastitis about 24/11/09).	Large uni-nuclear cells with some multi-nuclear and vacuolated cells. Large number of red-blood corpuscles.
II*a*.	4/11/09	Cows 33 and 34. Mixed milk.	Considerable number of multi-nuclear cells with some large uni-nuclear and vacuolated cells.
III.	10/11/09	Cow 35 (remained healthy).	Mixture of large uni-nuclear, multi-nuclear and vacuolated cells (not well stained).

No.	Date.	Nature of Slide.	Cells Present.
IV.	17/11/09	Cow 36 (developed a slow external inflammation of the udder, R.H. quarter).	Mostly multi-nuclear cells with a few large uni-nuclear, small uni-nuclear and vacuolated cells.
V.	24/11/09	Cow 38 (remained healthy).	Large uni-nuclear and vacuolated cells with a few multinuclears.

MILK OF SINGLE COWS.

No.	Date.	Nature of Slide.	Cells Present.
		Cow 1. (Farm A).	
I.	5/5/09	Mixed milk of all three quarters.	A mixture of large uni-nuclears with multi-nuclears. Small uni-nuclear cells very scanty. A few vacuolated cells. No eosinophiles. Many of the large uni-nuclears have a semilunar nucleus.
II.	5/5/09	Milk of Cow 1 as above mixed with milk of five healthy cows.	Much the same as Cow 1, but multi-nuclear cells scanty. Many of the large uni-nuclears show an apparently dividing or divided nucleus.
III.	12/5/09	Mixed milk of all three quarters.	Much the same as II.
IV.	12/5/09	Milk of Cow 1 and the milk of five healthy cows.	Much as II.
V.	19/5/09	Milk of two sound quarters.	Mostly of the large uni-nuclear type; not so well stained as usual. Many show the semilunar or divided nucleus. Hardly any other type of cell present; practically no multinuclears.
VI.	19/5/09	Milk of affected quarter.	Much the same as V., but a few small uni-nuclears and vacuolated cells present in addition.
VII.	26/5/09	Two sound quarters.	Practically all of the large uninuclear type.
VIII.	26/5/09	Affected quarter.	Much the same as VII. Cells nearly all of the large uninuclear type, with a few small uni-nuclears mostly of the normo-blastic type.
IX.	1/6/09	Two sound quarters.	Preponderating cells are of the multi-nuclear and small uninuclear types with a small admixture of large uni-nuclears.

No.	Date.	Nature of Slide.	Cells Present.
X.	1/6/09	Affected quarter.	Apparently mostly of the large uni-nuclear type, but the nuclear staining is very poor and the cells therefore indefinite.
XI.	8/6/09	Sound quarters.	Admixture of cells of the large uni-nuclear and multi-nuclear types.
XII.	8/6/09	Affected quarter.	The same as the sound quarter with some small uni-nuclear cells.
XIII.	11/6/09	Sound quarters.	Almost entirely of the large uni-nuclear type.
XIV.	15/6/09	Affected quarter.	An admixture of large un-nuclears and multi-nuclears. with a few small uni-nuclears
XV.	26/6/09	Sound quarters.	Mostly of the large uni-nuclear type with semi-lunar nuclei.
	The milk was again examined two months later.		
XVI.	30/8/09	Affected quarter.	Mostly of the large uni-nuclear type with semi-lunar nuclei, together with a few multi-nuclear cells, and an occasional small uni-nuclear.
XVII.	30/8/09	Sound quarters.	Same as last, with in addition a few vacuolated cells.
		Cow 26 (Farm B).	
I.	7/8/09	Mixed milk. High cell count. Diminished milk. No disease developed	Mostly multi-nuclears with some vacuolated cells. Large and small uni-nuclears scanty.
II.	18/8/09	Milk of two quarters with low count.	Some multi-nuclears, relatively large number of small uni-nuclears, and some vacuolated cells. Large uni-nuclears almost absent. A few red-blood corpuscles(staining indifferent).
III.	18/8/09	L.F. quarter. High count.	Mostly multi-nuclears. Relatively large number of vacuolated cells. A few small uni-nuclears. Large uni-nuclears almost absent. No red-blood corpuscles.
IV.	7/9/09	L.F. quarter.	Mostly multi-nuclears. A few large and small uni-nuclears. Relatively large number of vacuolated cells. No red-blood corpuscles.

No.	Date.	Nature of Slide.	Cells Present.
		Cow 27 (Farm B).	
I.	7/8/09	Mixed milk. High count. No disease developed.	Mostly multi-nuclears with a few large uni-nuclears and vacuolated cells.
II.	8/11/09 (Cow nearly dry)	L.H. quarter.	Much the same as I.
III.	8/11/09	L.F. quarter.	Much the same as I., but preponderance of multi-nuclears.
IV.	8/11/09	R.F. quarter. R.H. (no milk).	Much the same as I., with relatively numerous eosinophiles.
V.	10/1/10 (After calving)	Mixed milk. High count.	Some large uni-nuclears and vacuolated cells, many multi-nuclears and small uni-nuclears.
		Cow 2 (Farm C).	
I.	10/12/09	L.H. quarter. Very high count (21,000,000) from this quarter. No disease	Multi-nuclears with a small number of large uni-nuclears. Some vacuolated and eosinophile cells.
		Cow 6 (Farm C).	
I.	18/8/09	R.H. quarter. High count. No apparent disease.	Mostly multi-nuclears with some large and small uni-nuclears; many of the latter of the normoblastic type.
II.	18/8/09	Two other quarters. Low count.	Number of small uni-nuclears. Some multi-nuclears. Large uni-nuclears scanty (staining indifferent).
III.	15/1/10 (Nearly dry)	R.H. quarter. High count from this quarter.	Multi-nuclears with a smaller number of large uni-nuclears. Some small uni-nuclears and vacuolated cells.
IV.	15/1/10	L.H. quarter.	Same as R.H. quarter.
		Cow 37 (Farm D).	
I.	8/12/09	Mixed milk.	Considerable number of multi-nuclear cells with some large and small uni-nuclear and vacuolated cells.
II.	13/12/09	R.H. quarter giving heavy deposit	Large uni-nuclears with some multi-nuclears and a few small uni-nuclears. Some streptococci.

No.	Date.	Nature of Slide.	Cells Present.
III.	2/1/10	R.H. normal in appearance, but heavy deposit.	Same as II., with some vacuolated cells. Many of the large uni-nuclears with semi-lunar and horse-shoe nuclei. Many long chain streptococci.
IV.	2/1/10	R.F. normal.	Mostly multi-nuclears with some large and small uni-nuclears. Long chain streptococci abundant.
V.	2/1/10	L.F. normal.	Same as R.F.
VI.	2/1/10	L.H. swollen, heavy deposit.	Many multi-nuclears with large and small uni-nuclears and some vacuolated cells. Long chain streptococci abundant.
VII.	3/2/10	Milk of two fore-quarters mixed. Normal in appearance	Large uni-nuclears and multi-nuclears. Some of the large uni-nuclears with semi-lunar nuclei and vacuolated. A few small uni-nuclear and vacuolated cells. Long chain streptococci abundant.

Cow A.

This cow was not one used in our investigations, but was a healthy cow which received a blow, probably a kick, near the base of the R.H. quarter. The milk of the quarter was much diminished in quantity and streptococci (pathogenic to rabbits) appeared in the quarter. There was no outward sign of disease beyond the bruise, and on slaughtering the animal later, only a hard mass in the neighbourhood of the bruise was found, there being a very slight area of inflammation round this. Very heavy deposits were given by the milk from the bruised quarter.

No.	Date.	Nature of Slide.	Cells Present.
I.	21/4/09 (Immediately after accident.)	Mixed milk.	Mostly large uni-nuclears, many of which show divided nucleus. Some multi-nuclears and a few small uni-nuclears. Some masses of long chain streptococci.
II.	28/4/09	Mixed milk of three good quarters.	Mostly large uni-nuclears, some with semi-lunar or horse-shoe nucleus. Multi-nuclears comparatively scanty. A few red-blood corpuscles. No streptococci.

No.	Date.	Nature of Slide.	Cells Present.
III.	5/5/09	Bruised quarter.	Mostly large uni-nuclears, some with semi-lunar or horse-shoe nucleus. A few multi-nuclears.
IV.	12/5/09	Bruised quarter.	Apparently mostly large uni-nuclears, which however, are not well stained. Abundant long chain streptococci.
V.	12/5/09	Three sound quarters.	Mostly large uni-nuclears with some multi-nuclears. A few small uni-nuclears and vacuolated cells also present.
VI.	19/5/09	Bruised quarter.	Almost entirely large uni-nuclears which, however, are not well stained. A few long chain streptococci.
VII.	19/5/09	Three sound quarters.	Almost entirely large uni-nuclears

SPECIAL EXAMINATIONS.

No.	Date.	Nature of Slide.	Cells present.
I.	3/2/10	Milk of two cows (healthy and in calf), but nearly dry. High count	Large numbers of multi-nuclear cells present—both those with deep and those with pale-staining nuclei. The large uni-nuclear cells are less numerous.
II.	3/11/09	Milk of three cows nearly dry (barren)	Large uni-nuclears, with a good many vacuolated cells and a few multi-nuclears.
III.	19/1/10	Milk of four cows nearly dry (some in calf)	Mixture of all kinds of cells—large and small uni-nuclears, multi-nuclears, vacuolated and few eosinophiles.
IV.	17/5/09	Milk of cow before tuberculin injection	Abundance of large uni-nuclear and multi-nuclear cells. Fair number of small uni-nuclear (ordinary and normoblastic type) and vacuolated cells. No eosinophiles.
		Milk of cow three days after injection (cow reacted, but tuberculosis slight)	Practically the same as before injection.
V.	10/6/09	Milk from cow suffering from cowpox	Mostly multi-nuclears with a few large uni-nuclears and an occasional small uni-nuclear.

No.	Date.	Nature of Slide.	Cells Present.
VI.	24/8/09	Cow 28 (Farm B). R.H. moderate count	Mostly large uni-nuclears with a few multi-nuclear and vacuolated cells.
VII.		R.H. and L.F. mixed milk. Low count	Much the same as R.H. quarter.
VIII.		Mastitis deposit from serous liquid	Almost entirely large uni-nuclears, many with semi-lunar or horse-shoe nuclei.
IX.		Mastitis deposit from serous liquid (Cow 34)	Almost entirely multi-nuclear cells, with an occasional large uni-nuclear and vacuolated cell. No streptococci. Nothing like a poly-morphonuclear leucocyte present.

CONCLUSIONS.

It is difficult to formulate any general conclusions from this survey of the kinds of cells present in different conditions. All that can be said is that in the milk of healthy cows in full milk and which do not give a high cell count, the majority of cells tend to be of the type termed "large uni-nuclears," with a small admixture of other cells. At the beginning and end of lactation, or when the cell count is high, the multi-nuclears tend to be the predominant cell, and this is the case whether the high cell count is without discernible cause, or whether a definite mastitis is present. That is to say, a high cell count seems to be due to an increase of the multi-nuclears, and may or may not be associated with mastitis. These conclusions are in accordance with the hypotheses we have put forward as to the effect of various stimuli on the gland tissue of the udder. Substituting the word "polymorphonuclear leucocyte" for "multi-nuclear cell," our results are in general in accord with Savage (*loc. cit.*), *but we differ entirely as to the nature and origin of the actual cellular elements.* Even in the deposits from the serous fluid in catarrhal mastitis we do not find the presence of polymorphonuclear leucocytes and must conclude that the cells of the deposit are not "pus cells" in the ordinary acceptation. *It is not in our opinion possible to recognise diseased conditions by means of a microscopical examination of the cells present.*

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VII. Savage. Reports to the Medical Officer Local Government Board, 1907 *et seq.*
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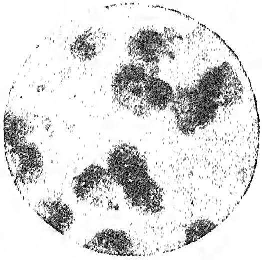
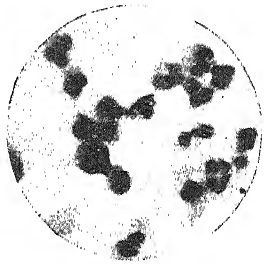
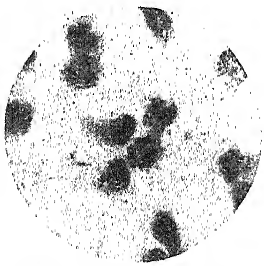


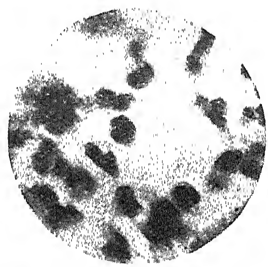
1. Large Uni-nuclears. × 750.



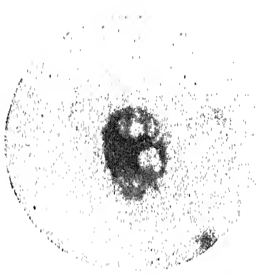
2. Multinuclears. × 750.



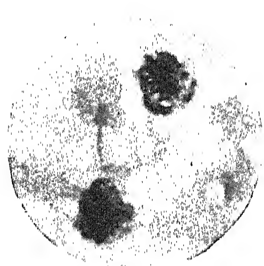
3. Multinuclears. × 750.



4. Multinuclears and Vacuolated Cell. × 750.



5. Vacuolated Cell. × 1,200.



5. Eosinophile Cells. × 1,200.

TYPES OF CELLULAR ELEMENTS FOUND IN MILK DEPOSITS.

ON THE NATURE OF THE CELLULAR ELEMENTS PRESENT IN MILK.

Part III.—The Milk of Animals other than the Cow.

(For the British Dairy Farmers' Association.)

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Having arrived at the conclusions stated in our last report, it seemed advisable to investigate the milk of animals other than the cow, to which hitherto we had confined our attention.

For this purpose we obtained samples of milk from the ass and goat, and also from the human subject. Naturally, we were not able to carry out these investigations in the systematic manner we had hitherto employed, but such systematic treatment was at the same time scarcely necessary. These selected animals provide a field of inquiry very different from that which the cow presents. The ass may be taken as the type of an animal from which it is possible to obtain milk in but limited quantity and only so long as the foal is present. The lactation is in no way " artificial," if such a term may be used, and the animal itself is of a quiet, docile, and stolid nature.

In the case of the goat we have an animal much more of the type of the cow, in that she will give milk over a fairly extended period without the necessity of keeping the kid by her. The milk-producing power has not, however, been developed to such a degree as in the cow, at least in goats usually found in England, and certainly not in the case of those used in our experiments.

Milk production in the human subject is in type similar to that in the ass, but we have here to deal with a highly sensitive and nervous organisation, which often affects lactation in a most profound manner.

It is most necessary to lay great stress on the fact that the milk-producing powers of the cow are the result of careful selection and breeding, so that both the udder itself and the process of lactation have become, to a large extent, artificial. The result is easily seen in the extremely sensitive nature of the cow's udder, making it react quickly and profoundly to external stimuli and rendering it very liable to damage and disease. It is for this reason that the cow's udder, in which the tendency to cell proliferation has been artificially encouraged by attempts to increase milk production, is liable to respond in a hyper-sensitive manner to minute causes, exactly in the way in which our experiments have indicated.

The relative position of the three specified animals is seen in a comparison of their body weight and average milk production, though it is, of course, extremely difficult to give either average weights or average milk yields in the case of any one of them.

Body Weight.	Milk Yield per Day.
Ass (450 lbs.)	4 pints.
Goat (100 lbs.)	2 ,,
Cow (1,100 lbs.)	24 ,,

Experiments were carried out exactly as in the case of cows: counts were made at frequent intervals and stained specimens were also prepared.

THE ASS.

Counts of the cellular elements in the milk of this animal are much hindered by the constant presence of a white, semi-crystalline deposit, which comes down on centrifugalisation. This deposit was examined and appeared to be of a protein nature, but no reason for its presence can be given, nor was the precise nature of it elucidated.

Ass 1.

(*First sample about three weeks after foaling.*)

Date.	Cells per c.c.
23/2/10	32,000
2/3/10	38,000
17/3/10	198,000
24/3/10	910,000
31/3/10	94,000
6/4/10	444,000
14/4/10	168,000
21/4/10	55,000
27/4/10	436,000
5/5/10	21,000
11/5/10	66,000
Milk ceased.	

This ass showed greater variations and at times bigger cell counts than were observed in any of the other cases examined.

Ass 2.

(*First sample four weeks after foaling.*)

Date.	Cells per c.c.
7/6/10	50,000
14/6/10	20,000
22/6/10	15,000
29/6/10	39,000
6/7/10	12,000
13/7/10	25,000
17/7/10	14,000

The cell count was at all times small and very uniform.

Ass 3.

(*First sample three weeks after foaling.*)

Date.	Cells per c.c.
26/7/10	12,000
9/8/10	7,000
16/8/10	12,000
25/8/10	24,000
30/8/10	16,000
27/9/10	20,000
19/10/10	(Deposit so large that no count was possible.)
25/10/10	10,000
9/11/10	26,000

The milk of this ass was distinguished by the white deposit referred to being in greater quantity than in the case of any of the other asses. On one occasion (October 19th, 1910) the deposit was quite one-eighth inch deep in the rotation tube, and precluded any hope of counting the cells.

Ass 4.

(*First sample three days after foaling.*)

Date.	Cells per c.c.
22/9/10	16,000
26/9/10	16,000
30/9/10	44,000
4/10/10	24,000
7/10/10	42,000
11/10/10	23,000
14/10/10	22,000
25/10/10	10,000

On account of the recent foaling, samples were examined every fourth day, but no effect at all on the count was observed. On several occasions, notably from the first to the fourth sample, much of the heavy white deposit was present. From October 7th, 1910, nearly all the cells were large in size and resembled the so-called "colostral bodies." The cell count was always

small and fairly constant. A certain number of stained preparations were examined with the following results:—

No. of Animal.	Date.	Nature of Cells present.
Ass 1.	23/2/10	Mostly large uni-nuclears and multi-nuclears.
Ass 1.	14/3/10	Cells very scanty. A few vacuolated cells and small uni-nuclears.
Ass 1.	24/3/10	Large number of multi-nuclears, with a few large and small uni-nuclears and vacuolated cells.
Ass 1.	31/3/10	Cells scanty. A few large and small uni-nuclears, multi-nuclears, and vacuolated cells.
Ass 1.	7/4/10	Cells scanty, as in last specimen.
Ass 1.	20/4/10	As in last specimen.
Ass 2.	17/6/10	Cells scanty, mostly large uni-nuclears.
Ass 2.	22/6/10	Very few cells. A few large and small uni-nuclears.
Ass 2.	29/6/10	Very few cells. Mostly small uni-nuclears, with some multi-nuclears, and a few large uni-nuclears.
Ass 2.	6/7/10	Cells practically absent.
Ass 2.	12/7/10	Cells very scanty. A few small uni-nuclears.
Ass 3.	.. ..	The slides contained so few cells that the examination was of no real value.

All these samples of asses' milk were distinguished by low cell counts, and the cells themselves stained with difficulty. This is quite in accordance with our conclusions, as it is evident that these cells are in such cases only cast off slowly and are consequently in a degenerate condition, hence their poor staining capacity and indefiniteness.

THE GOAT.

For the samples of goat's milk we are indebted to the kindness of W. Edmunds, Esq., M.D., who, having three goats at the Brown Institution allowed us to have samples weekly from these animals.

The description of the goats is as follows:—

GOAT 1.—Normal Anglo-Nubian. Born March 23rd, 1906. Kidded about March 30th, 1910. Weight, 47½ kilos.

GOAT 2.—English goat. Born in 1903 or 1904. In November, 1906, the thyroid gland was excised. Kidded, April 18th, 1910. Weight, 44½ kilos.

GOAT 3.—Born April, 1904. Both thyroids excised January 10th, 1907. Kidded, March 21st, 1910. Weight, 39 kilos.

All these goats were in splendid condition and quite healthy, with the exception of a temporary indisposition in the case of Goat 2. (*See below.*)

GOAT 1.

Date.	No. of Cells per c.c.
21/6/10	182,000
28/6/10	152,000
6/7/10	194,000
12/7/10	110,000
17/7/10	143,000
26/7/10	209,000

The cell-count was very regular and low, but was interfered with by the presence of much débris, and the fact that many of the cells were very small,

The microscopical examination of five slides gave the following results :—

Date.	Nature of Cells present.
21/6/10	Many vacuolated cells. Other cells mainly small uni-nuclears, some of the normoblastic type.
28/6/10	As in the last specimen.
6/7/10	Mostly small uni-nuclears and some vacuolated cells.
12/7/10	Large and small uni-nuclears.
17/7/10	Mostly small uni-nuclears, with a few large uni-nuclears and vacuolated cells.

Goat 2.

Date.	No. of Cells per c.c.
21/6/10	2,230,000
28/6/10	7,510,000
6/7/10	280,000
12/7/10	382,000
17/7/10	218,000
26/7/10	286,000

The very large cell count of the first two samples is noteworthy, and cause for it was sought. The goat was perfectly healthy, and the count was evidently not normal, as it fell the following week to a lower figure, and remained low. On careful inquiry it was found that this goat had arrived after a railway journey at the Brown Institution on June 8th, 1910, in rather poor condition, and had had diarrhoea till the 13th. Since that date she improved rapidly in condition, and the illness could only be ascribed to the railway journey. This is the only cause that can be assigned for the increased cell count, and according to our views is by no means improbable, and would illustrate again the effect of external causes on cell proliferation in the udder.

Three slides were stained and examined.

Date.	Nature of Cells present.
21/6/10	Chiefly small uni-nuclears, many of the normoblastic type, but many large uni-nuclears and multi-nuclears, and a few vacuolated cells.
12/7/10	Mostly small uni-nuclears.
17/7/10	As in the first specimen.

Goat 3.

Date.	No. of Cells per c.c.
12/7/10	311,000
17/7/10	521,000
26/7/10	184,000
2/8/10	316,000
9/8/10	538,000
16/8/10	680,000

The cell count is, as will be seen, fairly uniform, and calls for no comment. Stained preparations were practically identical in nature, the cells consisting mostly of multi-nuclears with some small uni-nuclears (many of the normoblastic type), and a few large uni-nuclears.

The milk of these three goats showed exactly the same types of cells as have been met with in the case of other animals. The fairly uniform count (with the exception of the two samples of Goat 2 already referred to) is probably the result of the easy and regular life of the animals. It is to be noted that the excision of the thyroid gland has no perceptible effect on the cell count.

HUMAN MILK.

By the kindness of the Medical Officer of the Queen Charlotte Hospital, Marylebone Road, a few samples of human milk were obtained and examined. It was not, in the nature of the case, possible to obtain successive samples, and each is dealt with separately.

Sample I., taken 11/6/10, seven days after birth. First child. Breasts normal and progress satisfactory.

Cells per c.c., 2,960,000. Stained preparations showed that a large number of the cells stained poorly and were therefore rather ill-defined. The majority of the cells were small uni-nuclears and multi-nuclears, with a few large uni-nuclears and vacuolated cells.

Sample II., taken 7/7/10, five days after birth. First child. Breasts and lactation normal.

Cells per c.c., 252,000, but the cells were in clumps, and probably the number is too low. Total deposit large. The cells were chiefly large uni-nuclears, many having semi-lunar or horse-shoe nuclei. Some small uni-nuclears, but practically no multi-nuclears.

Sample III., taken 8/7/10, six days after birth. First child. Breasts and lactation normal.

Cells per c.c., 2,640,000. Deposit large, and the count was rendered difficult by the presence of a large number of very small indefinite cells, which are not included.

The stained preparations showed that many cells were ill-defined, but almost all were large and small uni-nuclears. Many large uni-nuclears had semi-lunar or horse-shoe nuclei. Practically no multi-nuclears.

Sample IV., taken 7/7/10, two days after birth. Fifth child. Breasts and lactation normal. Total deposit large.

Cells per c.c., 7,440,000. The cells were large and well defined and in marked contrast to the foregoing samples. They were of all types, large and small uni-nuclears, multi-nuclears and vacuolated cells and some eosinophiles.

Sample V., taken 11/7/10, three days after birth. Number of children not stated. Breasts and lactation normal. Milk very yellow.

Cells per c.c., 563,000. Again the cells were well-defined and consisted of large and small uni-nuclears and some multi-nuclears and many vacuolated cells.

Sample VI., taken 11/7/10, six days after birth. Fifth child. Breasts and lactation normal. The milk, which was small in quantity, was very thin and watery, and there was a deposit of casein. A reliable count was impossible, but there were a large number of cells which, in stained preparations, were similar to Sample V.

The number of samples is too small for any generalisations, but it must be noted that in the three samples obtained from multipara, the cells were

much better defined and more varied in nature than in the case of the other three samples from primipara. The cells themselves were of quite the same nature as in other milks. We cannot pass by the very high cell counts obtained in one or two cases without a thought of the objection, so often raised, that the presence of "pus" in milk, if not actually harmful, is "sentimentally" repulsive!

SUMMARY.

The general consideration of these results only tends to confirm the conclusions already arrived at. A uniform type of life evidently tends to a fairly uniform excretion of tissue cells from the udder. The case of Goat 2 also emphasises the effect of outside causes in increasing temporarily this excretion, while some of the samples of human milk show plainly that very high cells count are not by any means necessarily connected with any diseased or disordered condition of the mammary gland.

We again emphasise the view we have already stated, viz., that in the cow the udder must be looked upon as an organ which has by breeding and selection been brought to an artificial condition of milk secretion, and that this has been accompanied by a stimulation of the tissues to cell proliferation, and that this proliferation may quite easily be caused to become abnormally great, leading to the appearance of an increased number of cells in the secretion. In support of this view we lay great stress on the fact constantly noticed by us, viz., that when the cell count is high for *any* reason, the cells themselves are always well-defined, showing little signs of degeneration, and also stain in a much more characteristic and definite manner, a fact which is difficult to explain if they are to be considered to be blood elements.

THE DORKING FOWL ON THE FARM.

By Joseph Pettipher.

The Dorking is at home almost anywhere where it can have its liberty and freedom to range, as it will travel long distances in search of the many little items which go to make up a satisfactory poultry menu. It is by no means a breed suited to confinement, no matter how carefully fed and managed, and should never be recommended to those who cannot give it at least a fair amount of liberty. Probably no other breed of equal size and carrying the same amount of flesh, even when in store condition, displays such marked activity as the Dorking. Mix a few Dorkings with any and as many other breeds as you like and note the results. The Dorking will be first off the perch in the morning, first to start ranging immediately it has breakfasted, go wider afield than any other, and be last out at night. In the summer time, and especially in dry weather, when worms, grubs, and other insect food is scarce, I have often noticed the Dorkings taking a last long range over the pasture in the twilight quite a long time after all other kinds are gone to roost for the night. This characteristic denotes not only the requirements of the bird for liberty, but also indicates that they are a profitable breed to keep, for they are small eaters when compared with almost any breed of equal size and, except in just the most severe weather, when there is no possibility of finding anything on the ground, they will obtain a large proportion of their own living, often coming home at eventide with crops so full that supper is a superfluity, scarcely acceptable when offered. The Dorking is in its element in the nobleman's park, the middle-class man's paddocks, or in the farmer's stackyard. In the present article I propose to treat specially of its adaptability to the circumstances and conditions of the farmer.

Poultry keeping and poultry culture in all their branches have made rapid strides during the past five and twenty years. Many new breeds have been introduced, some of them excellent farmers' fowls, but through all the chances and changes of fashion the Dorking remains pre-eminently a breed suited to the conditions under which farmers' fowls are usually kept, or at all events *should* be kept. It requires neither coddling nor any special care or treatment beyond that which any fowl should receive if it is to prove a profitable item in the farmer's balance sheet. For a number of years a very old fable went round that the Dorking was a delicate breed, suitable only to dry, gravelly soils, sheltered positions, and special care and attention. Never was a greater calumny uttered against any bird or any animal a farmer ever kept. One has only to look back on the records of the Dairy Show to find that on many occasions the finest prize Dorkings have frequently emanated from yards situate on wet, clay soils, particularly in a number of instances from the clay lands of Herefordshire; whilst for many

years Scotland has contributed a large quota of winners from some of her coldest quarters; and in Ireland—at Coleraine—where deciduous shrubs and plants of many kinds will not thrive owing to the climate, there have for many years been bred and reared Coloured Dorkings which, when sent across to our largest shows, have carried back premier honours and cups galore. One thing a Dorking must have, and that is comfortable quarters—damp or draughty houses are fatal to success. During the daytime there is usually somewhere on a farm where a Dorking can obtain dry and comfortable accommodation when Nature bids it do so, and of this it will not fail to avail itself, but if badly housed it will surely suffer, and when placed out in the fields in a portable house care should be taken to use only such structures as are thoroughly substantial and proof against both wet and wind. Given this the Dorking may be farmed out in the fields when necessary just as successfully as any other breed. But after all, though it may be only a fancy born of old associations, the Dorking always appears to look most at home in the farmyard and the stackyard, foraging amongst the sweepings of the stable or the heap of cavings from the recently thrashed cornstack, and taking its turn around the adjacent pastures at will in the interim. The Dorking breed of fowls is "as old as the hills," its present name of comparatively modern origin. The description of the fowls brought over to this country by the Romans very closely tallies with the Dorking of to-day, including the five toes which those worthy invaders considered so essential a characteristic of a first-class fowl. But this is not a chapter of history: let us rather deal with the Dorking as we have it to-day and its suitability to the requirements of the average agriculturist.

There are five recognised varieties of Dorkings—the White, the Dark, the Silver Grey, the Cuckoo, and the Red. Of these the White and Red colours are probably the oldest, but not to-day the largest kept or most popular. A short space may, however, be devoted to each, and as the most popular colour at the present time we will first take

Dark Dorkings.

These birds are sometimes also termed "Coloured" Dorkings, but this is merely a variation of title. Their exact origin is almost as much a mystery as that of the originals, but it is pretty certain that they emanated from a distinct cross. Lewis Wright quotes Mr. John Douglas as the originator. Harrison Weir once told me that Mr. Fisher Hobbs first introduced them and obtained them by a cross of Partridge Cochin on the old Grey or Speckled Dorkings of that day. Anyhow, the Dark Dorking as we know it to-day is as fixed and pure and breeds as true to type as any variety of poultry, probably more so than many I could mention. Five toes on each foot are undoubtedly a *sine qua non* of all Dorkings, but it is not enough to look for these alone. The true and typical Dorking has a shape peculiarly its own—full in chest, square and deep in body; its walk and carriage have an individuality that distinguishes it from all other breeds. The long straight keel or breast bone is of the utmost importance in a breed

which is pre-eminently a first-class table fowl, and the greatest possible care should be taken never to breed from crooked-breasted birds, as this serious defect is very hereditary, and, like all heavy-bodied breeds of the feathered tribe from the Runt pigeon upwards that are inclined to make flesh more rapidly than bone, there is the tendency to twisted breast bones, which without doubt are hereditary and transmitted to succeeding generations in such a marked degree that too great care cannot be exercised either when purchasing or selecting stock birds from one's own flock in seeing that every breeding bird has a long and perfectly straight breast bone. Being usually the heaviest of all the Dorkings, it is essential that Dark Dorkings should have large well-formed bones—particularly so in thigh, shank, and foot, as these not only evidence an ability to carry the heavy body, but also indicate the capacity for the necessary amount of flesh, which is of the finest and whitest quality. Dark Dorkings are usually seen with a single comb, though strains of rose-combed birds of this colour have been known to be bred true for years, and occasionally a rose-combed Dark has been placed at the head of a class at large shows. In this short article I do not propose to go into details of colour or other standard points farther than to guide as far as possible the farmer taking up the breed to select suitable specimens. The Darks and Silver Greys are perhaps looser in feather than the other colours, and consequently look comparatively larger; but these should be as tightly feathered as possible, and the full, sweeping tail should be carried well back from the body. What is usually termed "squirrel tail"—*i.e.*, the tail inclined towards the head and in bad cases sometimes touching the back should always be avoided, not only for appearance sake but also because it indicates a short, badly-formed body with inability to put on the desired amount of flesh. Round or "roach" backs should be avoided as, like crooked breasts, they are a deformity calculated to reduce the amount of meat. Very long legged birds should also be avoided. At one time the craze for short legs in Dark Dorkings was carried to an extreme; but a moderately short, stout, well set on leg with evenly spread foot is a characteristic of the breed. These general characteristics may be taken as applying to all Dorkings and need not be subsequently repeated.

Silver Grey Dorkings.

In shape, style, and general character the Silver Grey is an exact replica of the Dark variety, practically the only difference being in the colour of both sexes. The pure silver top colour and jet black breast of the cock and the lovely soft silver tops of the hens with their rich robin-coloured breasts make them very attractive in appearance, whilst their useful qualities are quite equal to the Darks, and as egg-producers they are quite as good and in some strains possibly better. There is an old "wheeze" that Silver Greys are a delicate variety, but though this may have become true of some few strains in consequence of too close inbreeding, it is not so generally—there

are plenty of strains of Silvers quite as robust in constitution as the Darks.

This variety originated by selection from the Darks in their early days of the lighter-coloured specimens. The late Mr. O. E. Cresswell, of Morney Cross, Hereford, was, I believe, the first to originate them, and he himself told me that he did so by selecting the most " silvery " coloured birds from his strains of Darks and carefully breeding to the desired type. They now breed as true as any other variety of Dorking.

White Dorkings.

As far as it is possible to trace the history of the Dorking fowl back to the time when it first took its name from the Surrey town, the evidence available goes to prove that the original birds were Whites, but until a comparatively recent date the comb of these birds was a single one. For upwards of a century now the Whites have, however, only been recognised as a rose-comb breed, though even now an occasional specimen comes out of the oldest strains with a single comb, and it is a notable fact that such are almost invariably the finest and largest specimens. It has always seemed to me that, as in Darks, so the Whites should be recognised with either single or rose combs, but up to now this has not been admitted.

For some years—in about the " eighties " and early " nineties "—White Dorkings were a popular breed and exhibited to a considerable extent. Of late years, owing probably to the craze for new varieties, they have dropped out of the exhibition arena, but there are still many yards where they are bred for their useful qualities and handsome appearance, though I am afraid in many cases there is a lack of size in this variety as compared with the general run of specimens bred and exhibited five and twenty years ago. Still, good strains can still be found, and I commend them as in my opinion the most generally useful of all Dorkings, and I am pleased to note at the present time some indications of a revival of their popularity.

The size of a White Dorking must not be judged by comparison with Darks or Silvers, as they are a much tighter and closer-feathered variety. Take a White and a Dark cockerel of equal weights and the latter will *look* much the larger bird in consequence of its looser feathering. Of all Dorkings the White is the most active and the best forager, finest in quality of flesh and the best layer. I once had a pullet of this breed that commenced laying at 4½ months old and subsequently secured first and cup at the Crystal Palace, thus proving the possibility of combining a good laying and an exhibition strain. The White has much individuality when compared with other Dorkings, and being tight-feathered keeps itself remarkably clean as a rule. It is every inch a farmer's fowl, and a good strain will compare favourably with not only other Dorkings, but also any other breed for farmyard purposes.

Cuckoo Dorkings.

These are very little kept nowadays. As their name implies, they are of a Cuckoo colour, being marked all over with broad bars of

dark blue on a whitish-grey or pale-blue ground. By some they were said to have originated from a cross between the White and Dark varieties, and, whilst it may be quite possible and comparatively easy to get them this way, I am of opinion that many of the original strains were produced by crossing in the American Dominique, which at that time was a highly praised breed of the same colour and markings, and a progenitor on one side of more than one of our present breeds of fowls. Be this as it may, the Cuckoo has become so nearly extinct that the best and most certain way of procuring a strain would, I think, be to set about its manufacture by crossing Darks and Whites in the way above indicated.

Red Dorkings.

Red, Grey, and Speckled fowls of the Dorking type have been known in Surrey farmyards for many generations—they were the farmyard fowl of the district before the days of shows or of standards. From these there have been selected from time to time in more recent years the best Red specimens, and these have been bred to type and colour by careful breeders, and at various times efforts, more or less spasmodic, have been made to popularise and spread them abroad, and at the present time a club has been formed for this purpose. The late Harrison Weir—whose knowledge of the Dorking was beyond question—thought very highly of these old Red Surrey Dorkings, and they are undoubtedly a very hardy, prolific, and generally useful breed, but they are not generally as large or shapely as the older Whites on the one hand or the more modern Darks and Silvers on the other. This is a point which a few years' careful breeding might remedy, and the Red is certainly commendable as an all-round farmer's fowl of much merit.

Crossing with Dorkings.

It is doubtful whether cross-breeding with any varieties of poultry is, as a rule, as advantageous as is very generally believed. The produce of a first cross between two pure breeds may be excellent, but when, as is usually the case, the female progeny has to be reserved for breeders, it requires both care and skill to prevent the strain deteriorating into mongrels that cannot be relied on to produce as good and regular qualities, either as table fowls or egg producers, as a pure breed. It is, however, a notable fact that, whilst our American poultry-producing cousins as a rule favour pure breeds, there is in this country a strong penchant for crossing, under the general impression that cross-breds are more hardy. However erroneous this notion may be, it undoubtedly obtains a strong hold on many poultry keepers, and where crossing is resorted to, either for eggs or table fowls or for a combination of both, the Dorking is one of the most generally useful breeds for the purpose. It is almost impossible to mate either male or female Dorkings to any other pure breed without improving the general quality of the offspring. The prepotency of the breed is phenomenal; wherever it is used it stamps its utility characteristics

on the succeeding generations in a way peculiarly its own, and more indelibly than any other variety. With the advent of the Brahma came the crossing of that breed with the Dorking, and it is questionable whether of the scores of subsequent crosses that have been tried a better first-cross table fowl has ever been produced than that derived from a light or dark Brahma male mated to Dorking hens, or from a White Dorking cock put down to Brahma hens of either colour. The Indian Game-Dorking is another most excellent cross for producing table birds. There is probably little to choose whether the Dorking be on the male or female side; in either case the Dorking cross counteracts the extreme yellowness of the skin and flesh of the Indian Game, which is otherwise such an excellent table fowl, and the cross produces a plump-breasted bird of fine quality, longer in keel and consequently superior to the pure-bred Indian; but it must be borne in mind that the Indian is a notoriously bad layer, and where the question of egg-production has to be considered in the pullets produced, they will not lay as well as pure Dorkings. But where practically the whole produce is intended for market, irrespective of sex, this cross is one to be highly recommended. A somewhat popular modern cross is that of a Dark Dorking cock mated to Buff Orpington hens. The Dorking greatly improves the flesh of the somewhat coarse Orpington, particularly in the cockerels, and the pullets thus produced make very good layers.

Mated to any of the Mediterranean breeds, such as Leghorns or Minorcas, the Dorking improves size and quality, and the combination are good egg-producers. In fact, you cannot misplace it for first crossing; and finally, when, as is often the case, a farmer desires to improve the general quality of a yard of cross-bred fowls, both for table and laying, no matter how well bred or how mongrel they may be, or of whatever the chief components of the hens may consist, there is no bird to be found more suitable, or that will more quickly and permanently improve the general character of the flock than the introduction of carefully selected, well-developed, pure-bred Dorking sires of either the White, Dark, or Silver Grey varieties.

The average agriculturist usually requires a breed that will come to hand fit for market direct from the farmyard. In most cases he has neither time nor yet convenience for a fattening plant, and there is no breed that will so well come up to these requirements under his conditions as will the pure-bred Dorking and its various crosses; but it must be borne in mind that in pure breeding the Dorking is a variety that will not stand too close inbreeding. Fresh blood from dependable strains should be regularly introduced, and the birds selected should be square-bodied, full-breasted, broad-shouldered specimens, long and deep in keel, straight in back, with well-spread feet and plenty of good hard round bone. And under no consideration should flabby-footed, weak-kneed, small, mean headed, narrow-chested, short-keeled, flat-shinned objects, sometimes termed Dorkings, be admitted. Such specimens are dear at any price and not worthy to be called Dorkings or worth the food they consume.

THE DAIRY SHOW OF 1910.

By S. R. Whitley, Little Westlands, Lingfield, Surrey.

The interest shown in the Association's Annual Exhibition was well maintained. The total number of entries was above the average. The demand for space has never been greater. It was impossible to satisfy all the applicants, and many would-be stallholders suffered disappointment. The following tabular statement shows at a glance the position of each section of the show:

—	1905.	1906.	1907.	1908.	1909.	1910.
Cattle	182	240	237	247	232	288
Milking and Butter Tests ...	217	247	245	224	236	264
Goats	51	51	48	72	84	75
Poultry	3,068	3,347	3,081	3,280	2,997	3,259
Pigeons	2,440	2,573	2,664	2,564	2,282	2,280
Poultry and Pigeon Appliances	—	55	65	50	37	—
British Cheese	268	255	420	357	355	362
Bacon and Hams	49	39	57	76	55	104
Butter	641	578	593	668	535	525
Cream	52	42	35	47	42	47
Skim-Milk Bread, &c. ...	121	159	118	135	115	98
Honey, &c.	124	118	67	85	88	96
New and Improved Inventions	22	17	33	37	31	34
Roots	170	156	177	181	218	196
Butter-Making Contests ...	206	199	200	207	120	145
Milkers' Contests	66	121	135	132	126	122
	7,677	8,197	8,175	8,362	7,553	7,895

Cattle.

The cattle this year were remarkable for the large number of entries, topping the previous record by 41, but against this we noted a seriously large number of absentees. Many had not calved within the prescribed time and so were ineligible; others were unable to put in an appearance owing to sundry private reasons. For the first time, cows required by the Council for the purposes of the Milkers' Contests (Classes 18 and 19) were accepted free of entry fee, and 48 were entered, but too large a proportion did not come.

As space has to be provided at considerable cost for all entered, and as the Milkers' Contests continue to maintain their great popularity and special cows must be provided, the Council might well consider whether some small entry fee should not be charged in these classes, the same to be returned to those that put in an appearance.

Cows to be used in the Milkers' Contests (Classes 18 and 19) were stalled in a double row across the hall between the bandstand and the Liverpool Road entrance. For the convenience of the contests this was a great gain, as the public could be excluded and the judges' work carried out without interruption, but the space between the two

rows of cows proved to be hardly sufficient. This new arrangement made it possible for the first time to get all the cows and heifers competing in the Milking Trials and Butter Tests within a ring fence, which greatly facilitated the carrying out of these trials.

The cattle classes, taken as a whole, were well up to the previous high standard of the Dairy Show, and it is pleasing to note that year by year the true Dairy Shorthorn type becomes more marked, and it is becoming quite the exception to see cows of the beef type at the London Dairy Show. The breeders of Pedigree Shorthorns can again congratulate themselves, as both the Spencer Cup winner (the cow gaining most points on Inspection, Milking Trials, and Butter Tests combined) and the Reserve thereto come from Class 1, though the Non-Pedigree class (No. 3) has the consolation of winning the Barham Challenge Cup (for the cow gaining the greatest number of points in the Milking Trials). It will be noticed that the numbers of the classes were slightly altered this year to allow of the heifers in each breed being placed next to the cows of the same breed, a detail which perhaps added to the symmetry of the show.

Of the Pedigree Shorthorns, it is worthy of remark that Mr. F. J. Stanhope's cow " Princess Ena " was first by Inspection and second in her class in the Milking Trials ; while Mr. Ellis Potter's cow " Lady Heggle " was second by Inspection and first in the Milking Trials, thus proving that beauty of form is not incompatible with the highest standard of excellence in milk-production. Again, in the Pedigree Shorthorn Heifers (Class 2), the animals winning by Inspection were well up in the money for the Milking Trials.

The Non-Pedigree Shorthorn Cows brought a strong class of 28 entries, and the judge considered them a credit to the Dairy Show. The entries in the corresponding Heifer class were 13 in number, and were well spoken of by the judge.

The Shorthorn Bulls, being restricted as usual to those animals with proved dairy ancestry, were well up to the average in numbers and highly spoken of as to quality.

Lincolnshire Red Shorthorn Cows and Heifers (Classes 5 and 6) were well-filled classes, and the animals gained very high commendation from the judge The prize money for this Heifer class was kindly provided by the Lincolnshire Red Shorthorn Association.

Of the Jersey classes, the judge remarks " that the Society may be congratulated on having secured what may fairly be called the highest all-round exhibit of Jersey cows and heifers which has been seen at any show during the present year." In the Bull class also, in spite of only four entries, he found the standard of merit so high that he was compelled to recommend a second prize.

Guernseys.—The judge has to lament a poor entry, only four present, but speaks highly of their quality. It is some years since the London Dairy Show has been able to gather together a really representative number of Guernsey cattle, and any suggestions for future improvement would be welcomed.

The Red Polls this year were encouraged by extra prizes offered by the Red Poll Cattle Society in both the cow and heifer sections,

and the judge reports quite a good representation of the breed, expressing the hope that entries may be larger in number at future Dairy Shows.

Ayrshire Cows were again only poorly represented, there being three entries with only two present, both of which were awarded prizes. It seems a pity that the London Dairy Show should fail so constantly to attract an exhibit worthy of a breed so well known for its dairy qualities; and here, again, the Council would welcome practical suggestions for improvement in this direction.

South Devon Cows were nine in number, though owned by only four exhibitors. The judge notes that both dairy and beef types of the breed were present. He thought the class, as a whole, worthy of high commendation, and specially mentions the only bull of this breed, which received a silver medal.

Kerries were only poorly represented by three entries in spite of the Special Milking Trial Cup offered by the English Kerry and Dexter Cattle Society. The class for Dexters had to be cancelled owing to insufficient entries.

Classes 18 and 19 for Pairs of Cows and Single Cows respectively brought a splendid lot of dairy cattle, perhaps the best ever seen in these classes.

Goats.

The judge of Goats reports well-filled classes, and thinks the quality of exhibits better than in any previous year, the whole being of high merit throughout.

A large number of goats entered for the Milking Trials, but the results were not very striking, and the best-yielding goat proved herself very inferior in quality of milk.

The class for Goatlings (No. 28) was so strong that the judge found it necessary to divide it into two sections, one for the Toggenburg type and one for the Anglo-Nubian type, members of the British Goat Society kindly finding the extra prizes.

Cheese.

Cheddars.—The judges regret the almost total absence of exhibits from the Scotch makers, but remarked that, considering the wet summer, the class for four Cheeses (No. 31) was better than could have been expected. They found Class 32 (for 20 Cheeses) inferior in character and quality to Class 31, and were somewhat disappointed with the Cheddar truckles.

The Cheshire Cheeses were specially encouraged this year through the generosity and very keen interest of our President, and he is to be congratulated on the fact that the judges are able to give very high praise to the classes on which they had to adjudicate. In every class mention is made of the fine flavour and good keeping qualities. Considering the largely increased number of entries, this is high praise indeed. Of Class 36 for 20 Cheshire Cheeses, the remark is made "that this is a very severe test to any farmer, as it is almost impossible to get every cheese perfect in flavour, considering the cheeses have to be made in hot weather."

Stiltons (no report from judge).—The number of entries was maintained and the quality of cheese up to the usual high standard.

Of Wensleydales there were 11 exhibits against 13 in 1909, and the judge reports very favourably on them, noting that the prize-winning lots were excellent in flavour and texture and very typical of true Wensleydales.

Lancashires (Class 40) produced only a small entry, but the judge found them of such good and even quality that there was difficulty in awarding prizes; some, however, were considered to have suffered in travelling.

Double Gloucesters were well up in numbers, but the flavour was hardly of the best, probably due to lack of sun during the summer. There was only a small entry in the class for Single Gloucesters.

The Leicesters were " not so good as they should be from a county like Leicestershire, and it is evident that the best dairies do not exhibit," but the judge does not hazard an opinion as to the reason. The Council of the British Dairy Farmers' Association are always willing to give their careful attention to any good advice, and it is hoped that Leicester cheese-makers will help the Council to obtain exhibits in future years worthy of the London Dairy Show.

The Derbys were considered a fine exhibit, but with some slight tendency to immaturity.

Caerphillies produced a large class of excellent cheeses.

In the class for Gervais only two exhibits were considered worthy of mention, but both the Cream Cheeses and the unripened Soft Cheeses were well represented.

Butter.

Of the Roll Butters the classes were again very large, but the judges report unequal exhibits, the prize-winners being very good, but many in the classes indifferent as to flavour and rather inclined to excess of moisture.

The butter made from scalded cream appears to have been excellent, and an extra first prize was awarded.

In the class for 24 lbs. in 12 Rolls, the judge criticises the packing and packages very severely, and it is evident that our British and Irish creameries have not yet reached the high standard of their Colonial *confreres* in this respect.

In the Colonial classes, the judge speaks well of the packages used and of the flavour of the butter, but thinks the texture in many cases might be improved. As to the class for Fresh Colonial Butter, the judge notes a marked improvement in some of the South Australian exhibits. Victorian creameries carried off all the three prizes.

Ornamental Butter.—The class for Ornamental or Fancy Butter produced rather fewer entries than in some previous years, but the judge reports those present as good.

Cream.

The classes of Cream were rather disappointing. The heterogeneous collection of vessels used were unsuitable in almost every case for ready sale of the commodity and also for transmission through the post. In the Clotted Cream class, first prize exhibit was fine and

rich; second prize only taking that position on account of being slightly thinner in substance, with equal flavour. A capital cream, not thickened too much, and placed in useful white ware jugs, secured first prize in the class for Cream other than Clotted; and exhibitors would do well to study that example of potting if they wish to have success.

Bacon and Hams.

It is a pleasure to record that these classes constituted a record in the matter of numbers, and the Council may be congratulated on having revised the schedule to some purpose, though competent critics think further improvement in this direction may still be made. For the first time a system of judging by points was adopted—the points being as follows:—

	Points.
Style and workmanship	15
Suitability of side, *i.e.*, its general proportions ...	20
Firmness of fat	10
Fineness of rind	5
Colour	20
Flavour, which includes mildness	30
	100

The Bacon classes appear to have been good, though entries might well be larger. "The trimming and butchering of the factory hams was exceedingly good"; but the judge laments a poor entry in the Farmers' class, only the first and second prize-winners being of commercial value. In the Selling class a good, all-round exhibit is reported.

Honey.

In spite of the year being so unfavourable to bee-keepers, the total number of entries exceeded those of several recent years, and the quality of the honey was reported as "uniformly good, with a total absence of honeydew." In the section classes, the judge calls attention to the not infrequent infringement of the rule with regard to overlacing the surface of the comb. The classes for light extracted and medium coloured extracted honeys were distinctly good, but the dark and heather honey classes were but poorly supported. The trophies made a good display, and the staging and position were favourably commented on.

Skim Milk Bread and Scones.

The total number of entries was slightly less than in previous years, but this section in general was highly praised by the judge, and it included exhibits from all over the country. Class 77 for White Bread comprised 35 entries and was a very strong class, there being two medals and 12 honorary cards awarded.

Class 78 for Brown Bread (with 25 entries) showed considerable improvement in the baking, although a number were still a little damp and inclined to be sticky. Class 79 for Fancy Bread brought only

a small entry, but the judge considered three lots at least very near perfection.

Class 80 for Home-made Bread brought 21 entries, eight of which were considered very good lots, though many of the others were heavy and close and too much baked. Class 81 for Twelve Scones contained 11 entries, which were of high quality.

Roots.

The classes for Roots were again well filled and exceptionally strong, but the judge deprecates the large number of coarse and gross Mangolds, suggesting that quality tends to suffer for mere size. Of the Swedes, he says they were an exceptionally fine, well-grown lot.

Butter-making Contests.

Round the bandstand, in the centre of the show, the Butter-making Contests were again a great feature and proved as attractive as ever to the general public. The various judges agree in reporting very good work done by the competitors, with some few exceptions, where the temperature of the hall was not allowed for.

In some cases, competitors seemed inclined to sacrifice too much to the mere technical point of getting good grain. Of the Championship class the judge says "it has seldom been my privilege to witness the work done all round in such a creditable manner."

The Milking Trials and Butter Tests were carried out as usual, and the arrangements were generally considered satisfactory. Full details of these competitions will be found in other parts of this journal.

The interest taken in the Milkers' Contests was well maintained, the number of entries being so large that it was found difficult to fully test all the competitors in the time available. The judges agree that a very high standard of excellence was reached in all the classes.

New Inventions.

In this class 34 exhibits were entered, but the judges report that "as a whole they were not indicative of any great amount of progress." They awarded Messrs. S. R. Docking & Co. (Croydon) a bronze medal for a Delivery Churn, and R. A. Lister & Co. (Dursley, Glos.) a similar medal for the "Dreadnought" Bottle Filler and Capper. Silver medals to A. Grabham & Co. (Englefield Road, N.) for a machine for washing and sterilizing large quantities of milk bottles and milk cans, a very ingenious invention, capacity 3,000 bottles per hour; to Martin's Cultivator Co. (Stamford) for a combined side delivery Rake, Swath Turner, and Tedder; and to the Wolseley Sheep Shearing Machine Co., Ltd., for the "Britannic" Patent Cream Separator, size A.

At frequent intervals throughout each day demonstrations were given illustrating the ways in which Buttermilk, Separated Milk, or Skim Milk may be utilised in the making of Scones. Exhibitions of trussing and shaping table poultry were also given by experts, and for the first time demonstrations were carried out by students of the British Dairy Institute, Reading, in preparing scalded cream. All drew attentive crowds, and proved of considerable educational value—the produce being very readily disposed of.

THE MILKING TRIALS OF 1910.

By W. Ashcroft, The Waldrons, Croydon.

The milking trials were carried out on the same lines as previous years.

The data on which the awards were calculated are as follows:—

- One point for every pound of milk yielded per day, taking the average of two days' yield;
- Twenty points for every pound of butter-fat as calculated from the analysis;
- Four points for every pound of solids other than fat, similarly calculated;
- One point for every 10 days since calving, after the first 40 days, the maximum allowance being 12.

Deductions were made of 10 points for each time the milk fell below the legal standard of 3 per cent. of fat, or below 8·5 per cent. of solids other than fat.

The cows were milked and stripped on Tuesday evening in the presence of the stewards, and the milk given on the morning and evening of Wednesday and Thursday was weighed. Samples of both milkings on Wednesday were taken and analysed, the analysis forming the basis from which, with the weight of milk, the calculations were made.

Two slight alterations in the standard of points required in each breed for a cow to win a prize had been made by the Council, viz., Pedigree Shorthorns raised from 90 to 95 and Kerries raised from 75 to 80; a standard also for heifers was fixed at two-thirds that required for cows of the same breed.

The standard for 1910 was therefore as follows:—

Shorthorns, Pedigree	95
Shorthorns, Non-Pedigree	110
Shorthorns, Lincolnshire Red	100
Jerseys	95
Guernseys	85
Red Polls	90
Ayrshires	85
Kerries	80
Dexters	75
South Devons	100

The number of animals tested were—

Cows	76
Heifers	36
Goats	13
Total ..	125

There were four classes of heifers tested, viz., Shorthorns (Pedigree, Non-Pedigree, and Lincolnshire Reds) and Red Polls, and they were almost as numerous as the cows in the same four breeds. In the writer's opinion, some check ought to be put on the number of heifers competing, as they needlessly take up room which might be given to cows, and no one can possibly think that the testing of a heifer after her first calf, is of anything like the value, as knowing what she will do when she comes to maturity. Heifers at that age may give a poor, a moderate, or a very good yield, but it by no means follows when they are older they would be placed in the same order. There were a large number of absentees, otherwise the available space in the hall would have been insufficient for the comfort of the animals.

Besides the calculations worked out for each cow at the end of this report, there are four tables brought up to date which may be of use in comparing previous results.

Table I. shows for each class the standard, number of cows tested, number above the standard, average points gained, and the points gained by the first three. in 1910.

Table II. shows the average points gained in each class for eleven years, 1900-1910.

Table III. gives the quantity and quality of milk for five years, 1906-1910.

Table IV., number of animals yielding milk deficient in fat or other solids for five years, 1906-1910.

The milk on the whole was of good quality. Amongst the cows there were considerably fewer deductions for deficiency in fat and solids other than fat, and in several of the classes an appreciable increase in the average points gained over the results of last year.

Taking the classes *seriatim* :—

Class 1—PEDIGREE SHORTHORNS.—Nothing is more satisfactory in the Dairy Shows of the last few years than the marked improvement in the milk yield of this class, for a good supply of young pedigree bulls from good milking ancestors is of paramount importance to the dairy farmer, and it is most gratifying to notice that the above improvement is even more marked this year.

By a reference to Table I. it will be seen that nine out of the 11 cows tested were above the standard, that the average points gained

in the class were 109·5, as against 97·5 last year, and that the three cows at the head of the class gained respectively 136·7, 134·5, and 118·6 points; the average percentage of fat was 3·77 in the morning's and 4·25 in the evening's milk. These facts speak for themselves, and we are glad to see Pedigree Shorthorns gradually working themselves back to the reputation they had 100 years ago of being deep and good milkers.

The Spencer Challenge Cup for the cow gaining the greatest number of points by Inspection, Milking Trial, and Butter Test, and the Lord Mayor's Champion Cup for the cow gaining the highest points above the standard of her breed, with the Reserve in both competitions, were taken by two cows in this class, Mr. F. J. Stanhope's "Princess Ena" and Mr. J. E. Potter's "Lady Heggle."

Class 2—PEDIGREE SHORTHORN HEIFERS, numbering 12, showed also a very marked improvement over the results of last year, half of them being above the standard (63), and the average of the class being 63·1, as against 53·3 last year, or 54, the average of the preceding four years.

Class 3—NON-PEDIGREE SHORTHORN COWS.—The results in this class were very similar to last year, the average points gained being 109·4, as against 108·4; seven out of the 16 cows tested were above the standard. The Barham Cup for the cow gaining the greatest number of points in the Milking Trials and Reserve for the same went to two cows in this class with the close competition of 138·5 and 138 points.

Class 4—NON-PEDIGREE SHORTHORN HEIFERS.—In this class there were several deductions for deficiency of fat, and the results were not good, two only out of the 11 being above the standard, and the average points gained being 65, as against 69·4 for the previous four years.

Class 5—LINCOLNSHIRE RED SHORTHORN COWS.—Eight cows were tested in this class, half of them being above the standard, and the average points of the class working out at 99·4, or very much the same as last year, when the average points were 101·7.

Class 6—LINCOLNSHIRE RED SHORTHORN HEIFERS were a very weak milkingclass, and the poorest of the heifer classes—one only out of six tested being above the standard. The average of this class was only 51, or considerably below the average gained in either of the other two Shorthorn classes or the Red Polls.

Class 7—JERSEYS.—The Jerseys were quite equal to previous years. Out of 19 cows nine were above the standard. The average points in the class were 90·5, and the three highest 111·6, 107·4, and 106·6.

Class 10—GUERNSEYS.—From a milking point of view Guernseys, as in several previous years, were not well represented. The average points of the three tested were only 77·9, and the highest points gained 82·5, with a yield of barely three gallons per day. These results do not do justice to the breed.

Class 12—RED POLLS.—This was a very good class, and thoroughly well maintained the reputation of Red Polls as good milkers. The seven tested averaged fully four gallons each, and their average points amounted to 95·5, being 5·5 above the standard 90; the first prize scoring 120. It is also worth noting that no deduction for lack of quality in the milk had to be made this year.

Class 13—RED POLL HEIFERS formed also a remarkably good milking class, all the seven heifers competing being above the standard of 60, and the average for the class worked out to 69·4 points, and 13 quarts of milk a day.

Class 14—AYRSHIRES.—This class was a poor one of two cows. One cow gave only 2½ gallons of milk, and the other had to suffer deduction twice, for milk being under 8·5 solids other than fat. The deficiency was not very much, the milk showing 8·41 morning and 8·42 evening, but it was there, and had to be taken into account. We can, therefore, hardly consider the milk yields of these two cows as fairly representing the breed.

Class 15—SOUTH DEVONS.—This was an excellent milking class. Six out of the seven tested were above the standard with an average of 118·9 points, and gave 5½ gallons milk per cow, though the seventh cow brought the average of the class to 107·2 points The three top cows gained 135 6, 132 6, and 126 2 points, so that the merit of the class was good every way.

Class 16—KERRIES, though small in numbers, were also a very good milking class with an average of 89·1. The three cows tested averaged close on four gallons of milk a day with an average percentage of butter fat of 4·04 morning and 4·81 evening—not a bad performance for these little cows.

The most remarkable feature in the milking results from the goats is the poor quality of milk of the Swiss and Toggenburg goats as compared with English or Anglo-Nubian, the Swiss and Toggenburg goats often giving milk below 3 and even 2½ per cent. of fat, whereas the milk from English-bred goats showed well over 5 per cent.

TABLE I.—SHOWING THE NUMBER OF COWS COMING UP TO THE STANDARD.

—		Standard	Cows Tested	Above Standard	Average Points Gained.	Points Gained by the First Three		
COWS.								
Shorthorns, Pedigree		95	11	9	109·5	136·7	134·5	118·6
Shorthorns, Non-Pedigree		110	16	7	109·4	138·5	138·0	133·4
Shorthorns, Lincolnshire Red		100	8	4	99·4	124·2	118·2	112·6
Jerseys		95	19	9	90·5	111·6	107·4	106·6
Guernseys		85	3	0	77·9	82·5	76·6	74·7
Red Polls		90	7	4	95·5	120·0	111·1	107·5
Ayrshires		90	2	0	74·6	87·7	61·5	—
Kerries		80	3	3	89·1	100·3	86·0	81·1
South Devons		100	7	6	107·2	135·6	132·6	126·2
HEIFERS.								
Shorthorns, Pedigree	$\frac{2}{3}$ of cows	63	12	6	63·1	85·7	81·4	78·6
Shorthorns, Non-Pedigree ..	,,	73	11	2	65·0	85·1	79·4	71·1
Shorthorns, Lincolnshire Red ..	,,	66	6	1	51·0	66·2	62·4	47·8
Red Polls	,,	60	7	7	69·4	79·6	77·5	69·1

TABLE II.—AVERAGE POINTS GAINED IN THE MILKING TRIALS.

YEAR	Shorthorn Pedigree	Shorthorn Non-Pedigree	Lincolnshire Reds	Jerseys	Guernseys	Red Polls	Ayrshires	Kerries	Dexters	South Devons
1910	109·5	109·4	99·4	90·5	77·9	95·5	74·6	89·1	—	107·2
1909	97·5	108·4	101·7	88·6	73·3	86·4	—	70·2	—	93·7
1908	99·5	103·6	95·7	82·3	80·7	74·1	62·6	74·3	66·8	—
1907	94·6	102·4	103·6	86·9	84·6	90·6	54·3	91·1	70·5	—
1906	88·0	93·2	—	83·9	83·6	76·5	85·4	81·3	65·8	111·5
1905	92·1	106·3	—	93·4	78·1	78·5	76·4	67·3	—	—
1904	73·6	101·1	—	91·5	76·1	85·4	51·2	79·5	62·9	—
1903	85·1	111·8	—	84·5	66·4	82·8	—	75·8	—	—
1902	75·6	105·3	—	77·8	66·4	80·0	40·5	62·0	71·6	—
1901	86·0	113·9	—	78·2	77·2	94·0	85·7	82·2	68·0	—
1900	72·4	108·2	—	63·4	80·3	87·5	—	71·1	55·7	—

Table III.—Quantity and Quality of Milk, 1906–1910.

Breed	Year	No. of Cows	Average Weight of Milk: Morn.	Average Weight of Milk: Even.	Total Weight of Milk	Fat: Morn.	Fat: Even.	Solids, not Fat: Morn.	Solids, not Fat: Even.	Total Solids: Morn.	Total Solids: Even.
Shorthorns, Pedigree	1906	11	23·9	22·8	46·7	3·26	3·46	8·91	8·95	12·17	12·41
	1907	17	24·2	23·7	47·9	3·14	3·98	9·02	8·88	12·16	12·86
	1908	15	24·2	24·0	48·2	3·26	3·88	9·18	8·84	12·44	12·72
	1909	19	23·2	22·1	45·3	3·43	4·27	8·98	8·80	12·41	13·07
	1910	11	26·0	24·0	50·0	3·77	4·25	9·08	9·03	12·85	13·28
Shorthorns, Pedigree (Heifers)	1906	3	14·8	13·9	28·7	3·64	4·10	9·46	9·11	13·10	13·21
	1907	7	11·7	11·4	23·1	3·70	3·60	9·16	9·37	12·86	12·97
	1908	9	16·1	16·6	32·7	2·70	3·36	9·20	8·95	11·90	12·31
	1909	13	14·3	13·4	27·7	3·49	3·74	9·24	9·06	12·73	12·80
	1910	12	16·6	15·2	31·8	3·22	3·74	9·42	9·29	12·64	13·03
Shorthorns, Non-Pedigree	1906	15	23·7	23·6	47·3	3·34	3·82	8·83	8·72	12·17	12·54
	1907	22	25·8	25·0	50·5	3·37	3·72	8·95	8·90	12·32	12·62
	1908	19	26·3	24·9	51·2	3·66	4·00	9·04	8·73	12·70	12·73
	1909	13	27·2	25·6	52·8	3·54	4·37	8·99	8·77	12·53	13·14
	1910	16	27·0	24·7	51·7	3·60	4·08	8·97	8·94	12·57	13·02
Shorthorns, Non-Pedigree (Heifers)	1906	7	16·0	15·3	31·3	3·41	3·95	9·10	9·05	12·51	13·00
	1907	8	18·8	17·7	36·5	3·28	3·54	9·24	9·24	12·52	12·78
	1908	4	17·8	16·9	34·7	3·80	3·74	9·29	9·12	13·09	12·86
	1909	10	18·7	17·6	36·3	3·04	3·69	9·26	9·03	12·30	12·72
	1910	11	16·6	16·0	32·6	3·31	3·72	9·33	9·24	12·64	12·96
Lincolnshire Red Shorthorns	1907	7	27·1	24·7	51·8	3·28	3·55	8·95	8·95	12·23	12·50
	1908	9	24·8	23·9	48·7	3·24	3·93	8·84	8·70	12·08	12·63
	1909	7	25·0	23·5	48·5	3·14	4·59	9·06	8·90	12·20	13·49
	1910	8	24·1	21·5	45·6	3·60	4·00	9·03	8·96	12·63	12·96
Jerseys	1906	13	17·1	16·0	33·1	4·69	4·81	9·34	9·32	14·03	14·13
	1907	12	18·0	16·9	34·9	4·51	5·68	9·25	9·09	13·76	14·77
	1908	16	17·4	16·8	34·2	4·07	4·91	9·32	8·99	13·39	13·90
	1909	23	17·7	16·6	34·3	4·85	5·76	9·44	9·09	14·29	14·85
	1910	19	18·6	15·9	24·5	5·15	5·66	9·17	9·08	14·32	14·74

QUANTITY AND QUALITY OF MILK, 1906-1910.—*Continued.*

Breed	Year	No. of Cows	Average Weight of Milk		Total Weight of Milk	Percentage Composition of Milk					
						Fat		Solids, not Fat		Total Solids	
			Morn.	Even.		Morn.	Even.	Morn.	Even.	Morn.	Even.
Guernseys	1906	6	17·9	16·6	34·5	4·33	4·51	9·31	9·26	13·64	13·77
	1907	5	17·4	18·3	35·7	4·58	4·60	9·39	9·30	13·97	13·90
	1908	5	17·5	16·1	33·6	4·49	4·88	9·08	8·76	13·57	13·64
	1909	6	16·0	13·3	29·3	4·81	5·08	9·40	9·11	14·21	14·19
	1910	3	17·4	14·6	32·0	4·11	4·94	9·26	9·12	13·37	14·06
Red Polls	1906	11	18·9	18·5	37·4	3·10	3·60	9·15	8·89	12·25	12·49
	1907	8	21·9	19·6	41·5	3·58	3·67	8·84	8·91	12·42	12·58
	1908	9	18·6	17·9	36·5	3·44	3·56	9·20	8·98	12·64	12·54
	1909	8	21·0	19·6	40·6	3·36	3·85	9·17	9·06	12·53	12·91
	1910	7	22·3	19·1	41·4	3·75	4·14	9·21	9·14	12·96	13·28
Red Polls (Heifers)..	1906	9	14·5	14·2	28·7	2·79	3·22	9·32	9·22	12·11	12·44
	1907	8	14·2	13·3	27·5	3·76	3·52	9·14	9·07	12·90	12·59
	1908	4	14·6	13·8	28·4	3·53	3·57	9·25	9·16	12·78	12·73
	1909	7	13·7	12·5	26·2	4·04	3·87	9·42	9·31	13·46	13·18
	1910	7	17·2	15·6	32·8	3·56	4·12	9·50	9·39	13·06	13·51
Ayrshires	1906	3	22·2	20·3	42·5	3·57	3·56	9·01	9·03	12·58	12·59
	1907	3	16·9	16·6	33·5	3·16	3·62	8·89	8·81	12·05	12·43
	1908	6	20·2	19·6	39·8	2·71	3·55	8·82	8·52	11·53	12·07
	1910	2	18·8	19·3	38·1	3·31	3·68	8·64	8·47	11·95	12·15
South Devons	1906	5	25·1	23·2	48·3	3·44	4·01	9·27	9·15	12·71	13·16
	1909	5	20·3	19·8	40·1	3·80	4·51	9·17	8·94	12·97	13·45
	1910	7	26·2	24·9	51·1	3·44	3·88	9·25	9·04	12·69	12·92
Kerries	1906	5	18·8	17·7	36·5	4·17	4·34	9·20	9·23	13·37	13·57
	1907	5	20·5	19·8	40·3	3·88	4·73	9·07	8·89	12·95	13·62
	1908	6	19·0	15·8	34·8	3·81	3·68	9·09	8·84	12·90	12·52
	1909	2	15·1	14·3	29·4	3·93	5·14	9·27	8·79	13·20	13·93
	1910	3	19·9	19·2	39·1	4·04	4·81	9·06	8·86	13·10	13·67

TABLE IV.—NUMBER OF ANIMALS YIELDING MILK DEFICIENT IN FAT OR OTHER SOLIDS.

—	Less than 3 per cent. of Fat					Less than 8·5 per cent. of other Solids				
	1906	1907	1908	1909	1910	1906	1907	1908	1909	1910
COWS.										
Shorthorns, Pedigree	4	8	4	2	1	1	2	2	1	0
Shorthorns, Non-Pedigree ..	4	8	4	3	2	3	0	4	4	1
Shorthorns, Lincolnshire Red	0	3	4	3	1	0	0	1	0	0
Jerseys	0	0	1	1	0	0	0	0	0	2
Guernseys	0	0	0	0	0	0	0	1	0	0
Red Polls	3	1	2	2	0	0	0	1	0	0
Kerries	0	0	0	0	0	0	0	1	0	0
South Devons	1	0	0	0	2	0	0	0	0	1
HEIFERS.										
Shorthorns, Pedigree	1	2	6	4	4	0	1	1	2	0
Shorthorns, Non-Pedigree ..	1	3	0	4	5	1	0	0	0	0
Shorthorns, Lincolnshire Red	0	0	0	0	3	0	0	0	0	0
Red Polls	5	2	1	0	1	0	1	0	0	0

Class 1.—PEDIGREE SHORTHORN COWS.

Number ...	1		2		5		9	
Name ...	Lady Lee 21st		Eaglethorpe Amy 5th		Ursulinda 2nd		Mild Eyebright 8th	
Age ...	8 yr. 8 m.		6 yr. 1 m. 2 w.		5 yr. 4 m. 2 w.		6 yr. 6 m. 3 w.	
Number of Calves ...	6		4		3		—	
Last Calved ...	Aug. 6.		Aug. 21.		Sept. 18.		June 15.	
Days since Calving ...	60		45		17		112	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	30·4	25·6	27·2	29·9	27·7	23·4	24·2	22·0
Weight of Milk, 2nd day ...	33·1	25·9	34·9	28·0	25·4	22·5	23·8	20·4
Average ...	31·7	25·7	31·0	28·9	26·5	22·9	24·0	21·2
Percentage Composition of the Milk. Fat ...	3·37	3·09	3·01	3·43	4·22	5·22	3·87	3·91
Percentage Composition of the Milk. Solids other than Fat ...	9·03	9·25	8·99	8·53	9·46	9·26	9·29	9·09
Percentage Composition of the Milk. Solids ...	12·40	12·34	12·00	11·96	13·68	14·48	13·16	13·00
Actual weight of Fat, in lbs. ...	1·07	·80	·93	·95	1·12	1·2	·93	·83
Calculation of Points multiply by 20 ...	21·4	16·0	18·6	19·0	22·4	24·0	18·6	16·6
Actual weight of Solids other than Fat, in lbs.	2·86	2·38	2·80	2·35	2·51	2·12	2·23	1·92
Calculation of Points multiply by 4 ...	11·44	9·52	11·2	9·4	10·04	8·48	8·92	7·68
Points: For time since Calving ...	2·0		·5		—		7·2	
Points: For weight of Milk ...	57·4		59·9		49·4		45·2	
Points: For weight of Fat ...	37·4		37·6		46·4		35·2	
Points: For weight of Solids other than Fat	20·9		20·6		18·5		16·6	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	117·7		118·6		114·3		104·2	
Remarks and Awards ...	Reserve		3rd Prize		High Commendation		High Commendation	

CLASS 1.—PEDIGREE SHORTHORN COWS—*Continued.*

Number ...	10		12		13		14	
Name ...	Joan		Lady Heggle		Prince s Ena		Favorite 3rd	
Age ...	5 yr. 6 m. 3 w.		8 yr. 6 m. 1 w.		7 yr. 1 m.		7 yr. 4 m. 2 w.	
Number of Calves ...	3		—		—		—	
Last Calved ...	April 10.		Sept. 1.		July 28.		Sept. 7.	
Days since Calving ...	178		34		69		28	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	19·4	20·6	31·8	26·2	24·2	25·6	20·8	20·8
Weight of Milk, 2nd day ...	23·4	16·0	32·6	28·0	29·1	27·9	20·7	22·5
Average ...	21·4	18·3	32·2	27·1	26·6	26·7	20·7	21·6
Percentage Composition of the Milk. Fat ...	4·10	3·68	4·55	5·01	5·36	5·80	3·92	5·53
Percentage Composition of the Milk. Solids other than Fat ...	9·24	9·28	8·99	8·71	8·94	8·60	9·00	8·77
Percentage Composition of the Milk. Solids ...	13·34	12·96	13·54	13·72	14·30	14·40	12·92	14·30
Actual weight of Fat, in lbs. ...	·88	·67	1·46	1·36	1·43	1·55	·81	1·2
Calculation of Points multiply by 20 ...	17·6	13·4	29·2	27·2	28·6	31·0	16·2	24·0
Actual weight of Solids other than Fat, in lbs.	1·86	1·7	2·9	2·36	2·38	2·3	1·86	1·9
Calculation of Points multiply by 4 ...	7·44	6·8	11·6	9·44	9·52	9·2	7·44	7·6
Points: For time since Calving ...	12·0		—		2·9		—	
Points: For weight of Milk ...	39·7		59·3		53·3		42·3	
Points: For weight of Fat ...	31·0		56·4		59·6		40·2	
Points: For weight of Solids other than Fat	14·2		21·0		18·7		15·0	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	96·9		136·7		134·5		97·5	
Remarks and Awards ...	High Commendation		1st=with 13 for Shorthorn Society's Prize: Reserve Spencer Cup, Lord Mayor's Champion Cup.		2nd = with 12 for Shorthorn Society's Prize, Spencer Cup, Reserve Lord Mayor's Champion Cup.		High Commendation	

CLASS 1.—PEDIGREE SHORTHORN COWS—*Continued.*

	16		21		23	
Name	Beauty		Darlington Cranford 22nd		Wild Cran 15th	
Age	5 yr. 5 m. 3 w.		5 yr. 6 m.		3 yr. 11 m.	
Number of Calves	2		—		—	
Last Calved	Sept. 19		Sept. 5.		Sept. 3	
Days since Calving	16		30		32	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	19·7	19·8	27·4	27·9	23·8	23·3
Weight of milk, 2nd day	20·9	22·0	28·1	26·4	26·0	24·4
Average	20·3	20·9	27·7	27·1	24·9	23·8
Percentage Composition of the Milk. Fat	3·72	4·35	2·24	3·09	3·10	3·72
Percentage Composition of the Milk. Solids other than Fat	9·16	9·09	8·60	8·77	9·26	9·28
Percentage Composition of the Milk. Solids	12·88	13·44	10·84	11·86	12·36	13·00
Actual weight of Fat, in lbs.	·75	·91	·62	·84	·77	·89
Calculation of Points multiply by 20	15·0	18·2	12·4	16·8	15·4	17·8
Actual weight of Solids other than Fat, in lbs.	1·86	1·9	2·38	2·38	2·3	2·2
Calculation of Points, multiply by 4	7·44	7·6	9·52	9·52	9·2	8·8
Points: For time since Calving	—		—		—	
Points: For weight of Milk	41·2		54·8		48·7	
Points: For weight of Fat	33·2		29·2		33·2	
Points: For weight of Solids other than Fat	15·0		19·0		18·0	
Total	—		103·0		—	
Deductions	—		10·0		—	
Points gained	89·4		93·0		99·9	
Remarks and Awards					High Commendation	

Class 2.—SHORTHORN HEIFERS (not exceeding Three Years old).

Number ...	24		25		26		33	
Name ...	Fair Princess		Clarence Browny 14th		Lady Alexandra		Lady Somerset 19th	
Age ...	2 yr. 7 m. 1 w.		2 yr. 6 m. 3 w.		2 yr. 11 m. 2 w.		2 yr. 11 m. 3 w.	
Number of Calves ...	—						—	
Last Calved ...	Sept. 10.		Aug. 25.		Sept. 16.		Aug. 30.	
Days since Calving ...	25		41		19		36	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	16·1	13·4	15·4	15·1	23·6	16·9	17·1	16·4
Weight of Milk, 2nd day ...	17·5	15·4	16·8	15·7	20·2	17·1	16·3	16·1
Average ...	16·8	14·4	16·1	15·4	21·9	17·0	16·7	16·2
Percentage Composition of the Milk. Fat ...	3·28	3·11	3·57	4·30	4·11	4·06	3·86	5·09
Percentage Composition of the Milk. Solids other than Fat ...	9·32	9·49	9·53	9·42	9·57	9·68	9·54	9·35
Percentage Composition of the Milk. Solids ...	12·60	12·60	13·10	13·72	13·68	13·74	13·40	14·44
Actual weight of Fat, in lbs. ...	·55	·45	·57	·66	·90	·69	·63	·82
Calculation of Points multiply by 20 ...	11·0	9·0	11·4	13·2	18·0	13·8	12·6	16·4
Actual weight of Solids other than Fat, in lbs.	1·57	1·37	1·53	1·45	2·1	1·65	1·6	1·52
Calculation of Points multiply by 4 ...	6·28	5·48	6·12	5·8	8·4	6·6	6·4	6·08
Points: For time since Calving ...	—		·1		—		—	
Points: For weight of Milk ...	31·2		31·5		38·9		32·9	
Points: For weight of Fat ...	20·0		24·6		31·8		29·0	
Points: For weight of Solids other than Fat	11·7		11·9		15·0		12·4	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	62·9		68·1		85·7		74·3	
Remarks and Awards ...			High Commendation		1st Prize		High Commendation	

Class 2.—SHORTHORN HEIFERS (not exceeding Three Years old)—*Continued.*

Number ...	37		38		39		41	
Name ...	Hinxton Mild Eyes		Hinxton Millicent		Solo 65th		Marchioness 44th	
Age ...	2 yr. 10 m. 2w. 3 d.		2 yr. 11 m. 2 w.		2 yr. 11 m.		2 yr. 9 m. 1 w.	
Number of Calves ...	—		—		—		—	
Last Calved ...	Aug. 17.		Aug. 20.		Sept. 8.		Sept. 20.	
Days since Calving ...	49		46		27		15	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	13·7	14·7	12·1	13·5	16·0	14·8	20·8	18·7
Weight of Milk, 2nd day ...	17·3	15·5	16·5	14·7	15·5	13·3	21·7	17·4
Average ...	15·5	15·1	14·3	14·1	15·7	14·0	21·2	18·0
Percentage Composition of the Milk. Fat ...	2·55	3·05	2·84	2·85	2·51	3·42	3·05	4·09
Percentage Composition of the Milk. Solids other than Fat ...	9·25	9·15	9·50	9·11	9·29	9·18	9·31	9·15
Percentage Composition of the Milk. Solids ...	11·80	12·20	12·34	11·96	11·80	12·60	12·36	13·24
Actual weight of Fat, in lbs. ...	·39	·46	·40	·4	·39	·48	·65	·74
Calculation of Points multiply by 20 ...	7·8	9·2	8·0	8·0	7·8	9·6	13·0	14·8
Actual weight of Solids other than Fat, in lbs.	1·43	1·38	1·36	1·28	1·45	1·29	1·97	1·65
Calculation of Points multiply by 4 ...	5·72	5·52	5·44	5·12	5·80	5·16	7·88	6·6
Points: For time since Calving ...	·9		·6		—		—	
Points: For weight of Milk ...	30·6		28·4		29·7		39·2	
Points: For weight of Fat ...	17·0		16·0		17·4		27·8	
Points: For weight of Solids other than Fat	11·2		10·5		10·9		14·4	
Total ...	59·7		55·5		58·0		—	
Deductions ...	10·0		20·0		10·0		—	
Points gained	49·7		35·5		48·0		81·4	
Remarks and Awards ...							2nd Prize.	

CLASS 2.—SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS OLD)—*Continued.*

Number	42		43		45		47	
Name	Waterloo Ruby 2nd		Primrose Foggathorpe 11th.		Stella		Amport Ursulina 4th	
Age	2 yr. 11 m. 3 w.		2 yr. 11 m. 2 w.		2 yr. 4 m. 3 w.		2 yr. 6 m. 3 w.	
Number of Calves	—		1		—		1	
Last Calved	July 19.		April 26.		Sept. 16.		Aug. 28.	
Days since Calving	78		162		19		38	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	21·3	20·8	16·4	15·2	14·4	13·4	10·0	10·1
Weight of Milk, 2nd day	22·8	21·4	15·5	14·6	12·0	14·1	10·7	8·3
Average	22·0	21·1	15·9	14·9	13·2	13·7	10·3	9·2
Percentage Composition of the Milk. Fat	2·64	3·42	3·19	3·88	3·01	3·57	4·06	4·09
Percentage Composition of the Milk. Solids other than Fat ...	9·12	9·18	9·67	9·52	9·63	9·25	9·40	9·01
Percentage Composition of the Milk. Solids	11·76	12·60	12·86	13·40	12·64	12·82	13·46	13·10
Actual weight of Fat, in lbs.	·58	·72	·51	·58	·40	·49	·42	·37
Calculation of Points multiply by 20 ...	11·6	14·4	10·2	11·6	8·0	9·8	8·4	7·4
Actual weight of Solids other than Fat, in lbs.	2·00	1·94	1·54	1·42	1·27	1·27	·97	·83
Calculation of Points multiply by 4 ...	8·0	7·76	6·16	5·68	5·08	5·08	3·88	3·32
Points: For time since Calving	3·8		12·0		—		—	
Points: For weight of Milk	43·1		30·8		26·9		19·5	
Points: For weight of Fat	26·0		21·8		17·8		15·8	
Points: For weight of Solids other than Fat	15·7		11·8		10·1		7·2	
Total	88·6		76·4		—		—	
Deductions ...	10·0		—		—		—	
Points gained	78·6		76·4		54·8		42·5	
Remarks and Awards	3rd Prize		Reserve					

CLASS 3.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1).

Number ...	52		53		54		55	
Name ...	Madge		Mossie		Susan		Primrose	
Age ...	6 yr.		6 yr. 3 m. 2 w.		10 yr.		6 yr. 6 m.	
Number of Calves ...	4		5		—		4	
Last Calved ...	Sept. 10.		June 23		July 15.		July 8.	
Days since Calving ...	25		104		82		89	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	25·6	25·0	17·4	18·2	20·0	17·4	29·5	23·4
Weight of Milk, 2nd day ...	27·2	25·8	19·0	18·4	20·2	17·6	33·6	27·1
Average ...	26·4	25·4	18·2	18·3	20·1	17·5	31·2	25·2
Percentage Composition of the Milk. Fat ...	3·90	4·49	2·71	3·57	3·94	4·07	4·93	3·53
Percentage Composition of the Milk. Solids other than Fat ...	9·42	9·21	8·65	8·73	8·80	8·83	8·85	8·97
Percentage Composition of the Milk. Solids ...	13·32	13·70	11·36	12·30	12·74	12·90	13·78	12·50
Actual weight of Fat, in lbs. ...	1·03	1·14	·49	·65	·79	·71	1·54	·89
Calculation of Points multiply by 20 ...	20·6	22·8	9·8	13·0	15·8	14·2	30·8	17·8
Actual weight of Solids other than Fat, in lbs.	2·5	2·34	1·57	1·6	1·77	1·55	2·76	2·26
Calculation of Points multiply by 4 ...	10·0	9·36	6·28	6·4	7·08	6·20	11·04	9·04
Points: For time since Calving ...	—		6·4		4·2		4·9	
Points: For weight of Milk ...	51·8		36·5		37·6		56·4	
Points: For weight of Fat ...	43·4		22·8		30·0		48·6	
Points: For weight of Solids other than Fat	19·3		12·6		13·2		20·0	
Total ...	—		78·3		—		—	
Deductions ...	—		10·0		—		—	
Points gained	114·5		68·3		85·0		129·9	
Remarks and Awards ...	High Commendation						Reserve	

CLASS 3.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number ...	57		58		59		60	
Name ...	Milk Maid		Buttercup		Matchless		Phyllis	
Age ...	Unknown.		Unknown.		8 yr.		7 yr.	
Number of Calves ...	—		—		—		—	
Last Calved ...	Sept. 7.		Sept. 4.		Aug. 27.		July 20.	
Days since Calving ...	28		31		39		77	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	25·5	23·9	21·0	19·8	37·0	32·4	25·2	24·2
Weight of Milk, 2nd day ...	26·4	25·5	20·4	19·7	39·1	34·0	26·0	24·5
Average ...	25·9	24·7	20·7	19·7	38·0	33·2	25·6	24·3
Percentage Composition of the Milk. Fat ...	3·20	4·07	4·68	5·72	2·79	3·97	3·59	4·51
Percentage Composition of the Milk. Solids other than Fat ...	8·70	8·53	9·40	9·08	8·71	8·53	9·21	9·09
Percentage Composition of the Milk. Solids ...	11·90	12·60	14·08	14·80	11·50	12·50	12·80	13·60
Actual weight of Fat, in lbs. ...	·83	1·01	·97	1·12	1·06	1·32	·92	1·10
Calculation of Points multiply by 20 ...	16·6	20·2	19·4	22·4	21·2	26·4	18·4	22·0
Actual weight of Solids other than Fat, in lbs.	2·25	2·10	1·95	1·78	3·31	2·84	2·36	2·20
Calculation of Points multiply by 4 ...	9·0	8·4	7·8	7·12	13·24	11·36	9·44	8·8
Points: For time since Calving ...	—		—		—		3·7	
Points: For weight of Milk ...	50·6		40·4		71·2		49·9	
Points: For weight of Fat ...	36·8		41·8		47·6		40·4	
Points: For weight of Solids other than Fat	17·4		14·9		24·6		18·2	
Total ...	—		—		143·4		—	
Deductions ...	—		—		10·0		—	
Points gained	104·8		97·1		133·4		112·2	
Remarks and Awards ...					3rd Prize		High Commendation	

CLASS 3.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number ...	61		62		65		66	
Name ...	Lady Wilson		Strawberry		Dot		Pearl	
Age ...	7 yr.		6 yr.		5 yr.		4 yr. 6 mo.	
Number of Calves ...	—		—		—		—	
Last Calved ...	Sept. 9.		Sept. 4.		Sept. 17.		Sept. 10.	
Days since Calving ...	26		31		18		25	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	33·6	29·8	22·7	22·5	26·5	23·5	23·8	21·5
Weight of Milk, 2nd day ...	33·8	32·1	23·6	21·7	27·0	23·9	23·9	26·1
Average ...	33·7	30·9	23·1	22·1	26·7	23·7	23·8	23·8
Percentage Composition of the Milk. Fat ...	3·83	4·02	3·56	4·76	3·69	4·59	3·56	3·95
Percentage Composition of the Milk. Solids other than Fat ...	9·03	9·02	9·10	9·44	8·87	8·91	9·10	9·05
Percentage Composition of the Milk. Solids ...	12·86	13·04	12·66	14·20	12·56	13·50	12·66	13·00
Actual weight of Fat, in lbs. ...	1·29	1·24	·82	1·05	·98	1·09	·85	·94
Calculation of Points multiply by 20 ...	25·8	24·8	16·4	21·0	19·6	21·8	17·0	18·8
Actual weight of Solids other than Fat, in lbs.	3·04	2·79	2·10	2·90	2·36	2·12	2·17	2·16
Calculation of Points multiply by 4 ...	12·16	11·16	8·4	11·6	9·44	8·48	8·68	8·64
Points: For time since Calving ...	—		—		—		—	
Points: For weight of Milk ...	64·6		45·2		50·4		47·6	
Points: For weight of Fat ...	50·6		37·4		41·4		35·8	
Points: For weight of Solids other than Fat	23·3		20·0		17·9		17·3	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	138·5		102·6		109·7		100·7	
Remarks and Awards ...	1st Prize and Barham Challenge Cup							

CLASS 3.—SHORTHORN COWS (NOT ELIGIBLE FOR CLASS 1)—*Continued.*

Number ...	69		70		72		74	
Name ...	Pride		Alice		Maggie May		Milkmaid	
Age ...	About 7 yr.		About 7 yr.		About 5 yr.		About 6 yr.	
Number of Calves ...	3		4		—		—	
Last Calved ...	Sept. 6.		Sept. 10.		Sept. 16.		Aug. 28.	
Days since Calving ...	29		25		19		38	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	32·4	30·6	25·3	24·7	25·6	22·7	35·3	31·1
Weight of Milk, 2nd day ...	32·7	29·5	26·8	23·5	27·7	23·3	34·4	28·4
Average ...	32·5	30·0	26·0	24·1	26·6	23·0	34·8	29·7
Percentage Composition of the Milk. Fat ...	3·36	3·31	3·09	3·57	3·01	3·29	3·91	3·90
Percentage Composition of the Milk. Solids other than Fat ...	8·98	8·79	8·50	8·43	9·39	9·47	8·91	9·00
Percentage Composition of the Milk. Solids ...	12·34	12·10	11·59	12·00	12·40	12·76	12·82	12·90
Actual weight of Fat, in lbs. ...	1·09	·99	·80	·86	·80	·76	1·36	1·16
Calculation of Points multiply by 20 ...	21·8	19·8	16·0	17·2	16·0	15·2	27·2	23·20
Actual weight of Solids other than Fat, in lbs.	2·92	2·64	2·2	2·04	2·5	2·18	3·1	2·68
Calculation of Points multiply by 4 ...	11·68	10·56	8·8	8·16	10·0	8·72	12·4	10·72
Points: For time since Calving ...	—		—		—		—	
Points: For weight of Milk ...	62·5		50·1		49·6		64·5	
Points: For weight of Fat ...	41·6		33·2		31·2		50·4	
Points: For weight of Solids other than Fat	22·2		16·9		18·7		23·1	
Total ...	—		100·2		—		138·0	
Deductions ...	—		10·0		—		—	
Points gained	126·3		90·2		99·5		138·0	
Remarks and Awards ...	High Commendation						2nd Prize Reserve for Barham Cup	

CLASS 4.—SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS, NOT ELIGIBLE FOR CLASS 2).

Number ...	78		79		80		81	
Name ...	Minnie		Jenny		Marechal Neil		Brigstock Ada 5th	
Age ...	2 yr. 10 m.		2 yr. 11 m.		2 yr. 10 m. 2 w.		2 yr. 5 m.	
Number of Calves ...	—		—		1		—	
Last Calved ...	Sept. 7.		Sept. 10.		Aug. 4.		Aug. 10.	
Days since Calving ...	28		25		62		56	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	17·6	18·1	15·7	16·2	21·4	18·2	13·0	11·7
Weight of Milk, 2nd day ...	20·0	18·0	17·7	16·7	22·4	20·0	15·0	12·4
Average ...	18·8	18·0	16·7	16·4	21·9	19·1	14·0	12·0
Percentage Composition of the Milk. Fat ...	2·86	3·94	3·07	3·65	3·41	3·14	3·39	2·78
Percentage Composition of the Milk. Solids other than Fat ...	9·48	9·26	9·53	9·45	9·15	9·10	9·27	9·42
Percentage Composition of the Milk. Solids ...	12·34	13·20	12·60	13·10	12·56	12·24	12·66	12·20
Actual weight of Fat, in lbs. ...	·54	·71	·51	·60	·75	·60	·47	·33
Calculation of Points multiply by 20 ...	10·8	14·2	10·2	12·0	15·0	12·0	9·4	6·6
Actual weight of Solids other than Fat, in lbs.	1·78	1·67	1·58	1·55	2·0	1·74	1·3	1·13
Calculation of Points multiply by 4 ...	7·12	6·68	6·32	6·20	8·0	6·96	5·2	4·52
Points: For time since Calving ...	—		—		2·2		1·6	
Points: For weight of Milk ...	36·8		33·1		41·0		26·0	
Points: For weight of Fat ...	25·0		22·2		27·0		16·0	
Points: For weight of Solids other than Fat	13·8		12·5		14·9		9·7	
Total ...	75·6		—		—		53·3	
Deductions ...	10·0		—		—		10·0	
Points gained	65·6		67·8		85·1		43·3	
Remarks and Awards ...					1st Prize			

CLASS 4.—SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS, NOT ELIGIBLE FOR CLASS 2)—*Continued.*

Number ...	82		85		86		87	
Name ...	Miss Blake		White Rose		Betsy		Sybil 12th	
Age ...	2 yr. 10 m.		2 yr. 11 m. 1 w.		2 yr. 11 m. 3 w.		2 yr. 11 m.	
Number of Calves ...	—		—		—		—	
Last Calved ...	May 8.		Sept. 5.		Sept. 15.		Sept. 16.	
Days since Calving ...	150		30		20		19	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	16·4	15·0	12·3	12·7	17·2	14·0	16·8	19·1
Weight of Milk, 2nd day ...	17·9	14·9	14·8	13·3	17·0	14·1	19·1	16·4
Average ...	17·1	14·9	13·5	13·0	17·1	14·0	17·9	17·7
Percentage Composition of the Milk. Fat ...	3·56	4·03	2·75	2·73	4·07	5·33	2·96	4·47
Solids other than Fat ...	9·58	9·57	8·79	9·11	9·03	8·73	9·48	9·21
Solids ...	13·14	13·60	11·54	11·84	13·10	14·06	12·44	13·68
Actual weight of Fat, in lbs. ...	·61	·60	·37	·35	·70	·75	·53	·79
Calculation of Points multiply by 20 ...	12·2	12·0	7·4	7·0	14·0	15·0	10·6	15·8
Actual weight of Solids other than Fat, in lbs.	1·64	1·43	1·18	1·18	1·55	1·22	1·70	1·63
Calculation of Points multiply by 4 ...	6·56	5·72	4·72	4·72	6·20	4·88	6·80	6·52
Points: For time since Calving ...	11·0		—		—		—	
For weight of Milk ...	32·0		26·5		31·1		35·6	
For weight of Fat ...	24·2		14·4		29·0		26·4	
For weight of Solids other than Fat	12·2		9·4		11·0		13·3	
Total ...	—		50·3		—		75·3	
Deductions ...	—		20·0		—		10·0	
Points gained	79·4		30·3		71·1		65·3	
Remarks and Awards ...	2nd Prize							

CLASS 4.—SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS, NOT ELIGIBLE FOR CLASS 2)—*Continued.*

Number ...	88		89		90	
Name ...	Meg		Ethel		Joan	
Age ...	2 yr. 10 m.		2 yr. 7 m. 2 w.		2 yr. 10 m. 1 w.	
Number of Calves ...	—		—		—	
Last Calved ...	Sept. 2.		Aug. 28.		Sept. 1.	
Days since Calving ...	33		38		34	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	21·3	19·0	16·5	14·6	16·8	14·3
Weight of Milk, 2nd day ...	22·4	19·1	17·2	16·4	17·9	14·3
Average ...	21·8	19·0	16·8	15·5	17·3	14·3
Percentage Composition of the Milk. Fat ...	2·84	3·24	3·98	3·86	3·61	3·82
Percentage Composition of the Milk. Solids other than Fat ...	9·60	9·12	9·22	9·24	9·59	9·48
Percentage Composition of the Milk. Solids ...	12·44	12·36	13·20	13·10	13·20	13·30
Actual weight of Fat, in lbs. ...	·62	·61	·67	·60	·62	·55
Calculation of Points multiply by 20 ...	12·4	12·2	13·4	12·0	12·4	11·0
Actual weight of Solids other than Fat, in lbs.	2·10	1·73	1·55	1·43	1·66	1·36
Calculation of Points multiply by 4 ...	8·40	6·92	6·20	5·72	6·64	5·44
Points: For time since Calving ...	—		—		—	
Points: For weight of Milk ...	40·8		32·3		31·6	
Points: For weight of Fat ...	24·6		25·4		23·4	
Points: For weight of Solids other than Fat	15·3		11·9		12·0	
Total ...	80·7		—		—	
Deductions ...	10·0		—		—	
Points gained	70·7		69·6		67·0	
Remarks and Awards ...						

Class 5.—LINCOLNSHIRE RED SHORTHORN COWS.

Number ...	91		92		93		94	
Name ...	Stenigot Bloom 10th		Bracebridge 79B		Panton No. 266		Bracebridge No. 3B	
Age ...	6 yr. 6 m.		4 yr. 9 m. 10 w.		9 yr.		6 yr. 11 m.	
Number of Calves ...	5		2		—		—	
Last Calved ...	June 2.		Sept. 19.		May 1.		June 12.	
Days since Calving ...	125		16		157		115	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	16·8	14·5	26·6	21·1	21·2	18·2	27·6	24·1
Weight of Milk, 2nd day ...	17·6	15·5	26·4	24·0	17·5	12·0	30·0	25·0
Average ...	17·2	15·0	26·5	22·5	19·3	15·1	28·8	24·5
Percentage Composition of the Milk. — Fat ...	4·37	4·43	3·83	4·87	3·74	4·28	3·52	3·74
Percentage Composition of the Milk. — Solids other than Fat ...	9·23	9·27	9·05	9·17	8·86	8·62	8·94	8·66
Percentage Composition of the Milk. — Solids ...	13·60	13·70	12·88	14·04	12·60	12·90	12·46	12·40
Actual weight of Fat, in lbs. ...	·75	·66	·98	1·09	·72	·65	1·01	·92
Calculation of Points multiply by 20 ...	15·0	13·2	19·6	21·8	14·4	13·0	20·2	18·4
Actual weight of Solids other than Fat, in lbs.	1·48	1·39	2·31	2·06	1·71	1·30	2·58	2·12
Calculation of Points multiply by 4 ...	5·92	5·56	9·24	8·24	6·84	5·20	10·32	8·48
Points — For time since Calving ...	8·5		—		11·7		7·5	
Points — For weight of Milk ...	32·2		49·0		34·4		53·3	
Points — For weight of Fat ...	28·2		41·4		27·4		38·6	
Points — For weight of Solids other than Fat	11·4		17·4		12·0		18·8	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	80·3		107·8		85·5		118·2	
Remarks and Awards ...			Reserve				2nd Prize	

CLASS 5.—LINCOLNSHIRE RED SHORTHORN COWS—*Continued.*

Number	95		96		97		98	
Name	Burton Quality 5th		Burton Ruby 12th		Burton Fuchsia 3rd		Burton Ruby Spot 2nd	
Age	5 yr. 8 m.		4 ys. 10 m.		8 yr.		9 yr. 5 m.	
Number of Calves	3		2		4		6	
Last Calved	Aug. 25.		Sept. 19.		May 25.		Sept. 3.	
Days since Calving	41		16		133		32	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	22·7	21·0	27·3	25·9	29·5	26·1	20·2	20·5
Weight of Milk, 2nd day	23·3	20·5	30·5	25·5	27·8	29·3	21·8	21·3
Average	23·0	20·7	28·9	25·7	28·6	27·7	21·0	20·9
Percentage Composition of the Milk. Fat	4·11	4·22	3·12	3·83	3·35	3·52	2·81	3·11
Percentage Composition of the Milk. Solids other than Fat ...	8·83	8·78	9·44	9·23	8·91	8·90	9·03	9·09
Percentage Composition of the Milk. Solids	12·94	13·00	12·56	13·06	12·26	12·42	11·84	12·20
Actual weight of Fat, in lbs.	·95	·87	·90	·98	·96	·97	·59	·65
Calculation of Points multiply by 20 ...	19·0	17·4	18·0	19·6	19·2	19·4	11·8	13·0
Actual weight of Solids other than Fat, in lbs.	2·01	1·81	2·73	2·38	2·55	2·46	1·90	1·90
Calculation of Points multiply by 4 ...	8·04	7·24	10·92	9·52	10·20	9·84	7·60	7·60
Points: For time since Calving	·1		—		9·3		—	
Points: For weight of Milk	43·7		54·6		56·3		41·9	
Points: For weight of Fat	36·4		37·6		38·6		24·8	
Points: For weight of Solids other than Fat	15·2		20·4		20·0		15·2	
Total	—		—		—		81·9	
Deductions ...	—		—		—		10·0	
Points gained	95·4		112·6		124·2		71·9	
Remarks and Awards			3rd Prize		1st Prize			

CLASS 6.—LINCOLNSHIRE RED SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS).

Number ...	102		103		104		105	
Name ...	Deeping Daisy 3rd		Lady Burton 3rd		Burton Tulip 5th		Burton Rose 11th	
Age ...	2 yr. 7 m. 4 w.		2 yr. 9 m.		2 yr. 7 m. 1 w.		2 yr. 6 m. 1 w.	
Number of Calves ...	1		1		—		—	
Last Calved ...	May 10.		Aug. 27.		Sept. 18.		Sept. 18.	
Days since Calving ...	148		39		17		17	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	6·0	5·9	18·3	16·5	14·8	15·1	15·5	15·7
Weight of Milk, 2nd day ...	6·7	5·9	19·7	17·6	15·0	13·9	17·2	15·9
Average ...	6·3	5·9	19·0	17·0	14·9	14·5	16·3	15·8
Percentage Composition of the Milk. Fat ...	5·41	4·50	2·21	2·69	2·79	3·30	3·04	3·66
Percentage Composition of the Milk. Solids other than Fat ...	9·83	9·86	9·21	9·15	9·07	9·0	9·8	9·74
Percentage Composition of the Milk. Solids ...	15·24	14·36	11·42	11·84	11·86	12·30	12·84	13·40
Actual weight of Fat, in lbs. ...	·34	·26	·42	·46	·41	·48	·50	·58
Calculation of Points multiply by 20 ...	6·8	5·2	8·4	9·2	8·2	9·6	10·0	11·6
Actual weight of Solids other than Fat, in lbs.	·62	·58	1·75	1·56	1·35	1·31	1·60	1·54
Calculation of Points multiply by 4 ...	2·48	2·32	7·00	6·24	5·40	5·24	6·40	6·16
Points: For time since Calving ...	10·8		—		—		—	
Points: For weight of Milk ...	12·2		36·0		29·4		32·1	
Points: For weight of Fat ...	12·0		17·6		17·8		21·6	
Points: For weight of Solids other than Fat	4·8		13·2		10·6		12·5	
Total ...	—		66·8		57·8		—	
Deductions ...	—		20·0		10·0		—	
Points gained	39·8		46·8		47·8		66·2	
Remarks and Awards ...							1st Prize	

CLASS 6.—LINCOLNSHIRE RED SHORTHORN HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

	106		107	
Number ...	106		107	
Name ...	Burton Ruby Spot 7th		Burton Quantity 4th	
Age ...	2 yr. 7 m. 1 w.		2 yr. 7 m. 2 w.	
Number of Calves ...	—		—	
Last Calved ...	Sept. 18.		Sept. 7.	
Days since Calving ...	17		28	
	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	12·0	13·0	15·6	14·6
Weight of Milk, 2nd day ...	14·1	13·3	16·5	14·5
Average ...	13·0	13·1	16·0	14·5
Percentage Composition of the Milk. Fat ...	2·67	3·91	3·38	3·41
Solids other than Fat ...	9·57	9·39	9·22	9·29
Solids ...	12·24	13·30	12·60	12·70
Actual weight of Fat, in lbs. ...	·35	·51	·54	·49
Calculation of Points multiply by 20 ...	7·0	10·2	10·8	9·8
Actual weight of Solids other than Fat, in lbs.	1·24	1·23	1·48	1·35
Calculation of Points multiply by 4 ...	4·96	4·92	5·92	5·40
Points: For time since Calving ...	—		—	
For weight of Milk ...	26·1		30·5	
For weight of Fat ...	17·2		20·6	
For weight of Solids other than Fat	9·8		11·3	
Total ...	53·1		—	
Deductions ...	10·0		—	
Points gained	43·1		62·4	
Remarks and Awards ...				

Class 7.—Jersey Cows.

Number ...	108		109		112		113	
Name ...	Vanilla 2nd		Goddington Vanilla		Tuddies Queen 2nd		Mrs. Viola	
Age ...	10 yr. 4 m 2 w.		4 yr. 4 m. 3 w.		7 yr. 4 m. 1 w.		10 yr. 1 m.	
Number of Calves ...	10		3		—		7	
Last Calved ...	July 6.		June 18.		June 16.		June 19.	
Days since Calving ...	91		109		111		108	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	17·5	17·5	16·8	15·6	21·2	14·1	19·8	17·5
Weight of Milk, 2nd day ...	19·9	17·4	17·3	14·9	13·9	14·5	21·0	17·9
Average ...	18·7	17·4	17·0	15·2	17·5	14·3	20·4	17·7
Percentage Composition of the Milk. Fat ...	3·40	5·22	4·33	5·25	6·04	8·19	5·08	5·78
Percentage Composition of the Milk. Solids other than Fat ...	8·92	8·48	9·15	8·89	8·62	8·41	9·38	9·02
Percentage Composition of the Milk. Solids ...	12·32	13·70	13·48	14·14	14·66	16·60	14·46	14·80
Actual weight of Fat, in lbs. ...	·64	·91	·74	·80	1·06	1·17	1·03	1·02
Calculation of Points multiply by 20 ...	12·8	18·2	14·8	16·0	21·2	23·4	20·6	20·4
Actual weight of Solids other than Fat, in lbs.	1·67	1·47	1·56	1·35	1·51	1·20	1·91	1·60
Calculation of Points multiply by 4 ...	6·68	5·88	6·24	5·40	6·04	4·80	7·64	6·40
Points: For time since Calving ...	5·1		6·9		7·1		6·8	
Points: For weight of Milk ...	36·1		32·2		31·8		38·1	
Points: For weight of Fat ...	31·0		30·8		44·6		41·0	
Points: For weight of Solids other than Fat	12·5		11·6		10·8		14·0	
Total ...	84·7		—		94·3		—	
Deductions ...	10·0		—		10·0		—	
Points gained	74·7		81·5		84·3		99·9	
Remarks and Awards ...							High Commendation	

CLASS 7.—JERSEY COWS—*Continued.*

Number	117		118		119		120	
Name	Irish Lass		Duckwing		Venus		Wissy Maiden	
Age	6 yr. 0 m. 3 w.		9 yr. 8 m. 1 w.		4 yr. 11 m. 3 w.		3 yr. 5 m.	
Number of Calves	—		7		3		2	
Last Calved	March 7.		April 15.		June 30.		Aug. 14.	
Days since Calving	212		173		97		52	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	18·3	16·8	21·1	18·9	19·5	17·9	17·4	15·0
Weight of Milk, 2nd day	18·5	16·0	21·1	17·2	20·0	16·8	16·7	13·8
Average	18·4	16·4	21·1	18·0	19·7	17·3	17·0	14·4
Percentage Composition of the Milk. Fat	4·33	6·92	4·88	5·14	4·98	4·78	4·74	4·38
Percentage Composition of the Milk. Solids other than Fat ...	9·15	8·98	8·96	8·84	9·46	9·20	9·10	8·98
Percentage Composition of the Milk. Solids	13·48	15·90	13·84	13·98	14·44	13·98	13·84	13·36
Actual weight of Fat, in lbs.	·80	1·19	1·03	·92	·98	·83	·80	·33
Calculation of Points multiply by 20 ...	16·0	23·8	20·6	18·4	19·6	16·6	16·0	6·6
Actual weight of Solids other than Fat, in lbs.	1·68	1·47	1·90	1·60	1·86	1·60	1·55	1·29
Calculation of Points multiply by 4 ...	6·72	5·88	7·60	6·40	7·44	6·40	6·20	5·16
Points: For time since Calving	12·0		12·0		5·7		1·2	
Points: For weight of Milk	34·8		39·1		37·0		31·4	
Points: For weight of Fat	39·8		39·0		36·2		22·6	
Points: For weight of Solids other than Fat	12·6		14·0		13·8		11·3	
Total	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	99·2		104·1		92·7		66·5	
Remarks and Awards	High Commendation		Reserve					

CLASS 7.—JERSEY COWS—*Continued.*

Number ...	121		122		125		126	
Name ...	Freegrove Lily		Darling 2nd		Golden Jolly's Pet		Ghezireh	
Age ...	5 yr. 8 m. 3 w.		9 yr. 5 m. 3 w.		4 yr. 5 m. 1 w.		4 yr. 4 m. 3 w.	
Number of Calves ...	—		—		—		3	
Last Calved ...	April 21.		March 31.		May 2.		April 8.	
Days since Calving ...	167		188		156		180	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	21·1	14·8	13·0	11·3	11·4	9·1	19·9	16·0
Weight of Milk, 2nd day ...	18·8	14·8	13·6	11·5	10·2	9·6	18·2	15·8
Average ...	19·9	14·8	13·3	11·4	10·8	9·3	19·0	15·9
Percentage Composition of the Milk. Fat ...	6·03	4·96	6·32	7·16	6·07	5·56	5·54	6·33
Percentage Composition of the Milk. Solids other than Fat ...	9·67	9·90	9·48	9·14	9·15	9·50	8·68	8·83
Percentage Composition of the Milk. Solids ...	15·70	14·86	15·80	16·30	15·22	15·06	14·22	15·16
Actual weight of Fat, in lbs. ...	1·20	·73	·84	·82	·66	·52	1·10	1·0
Calculation of Points multiply by 20 ...	24·0	14·6	16·8	16·4	13·2	10·4	22·0	20·0
Actual weight of Solids other than Fat, in lbs.	1·92	1·47	1·26	1·04	·99	·88	1·65	1·40
Calculation of Points multiply by 4 ...	7·68	5·88	5·04	4·16	3·96	3·52	6·60	5·60
Points: For time since Calving ...	12·0		12·0		11·6		12·0	
Points: For weight of Milk ...	34·7		24·7		20·1		34·9	
Points: For weight of Fat ...	38·6		33·2		23·6		42·0	
Points: For weight of Solids other than Fat	13·5		9·2		7·4		12·2	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	93·8		79·1		62·7		101·1	
Remarks and Awards ...	High Commendation						High Commendation	

CLASS 7.—JERSEY COWS—*Continued.*

Number ...	127		128		129		130	
Name ...	Burgh Mabel		Marigold		Malmsey		New Year's Gift	
Age ...	5 yr. 3 m. 3w.		9 yr. 2 m. 3 w. 3 d.		5 yr. 0 m. 3 w.		3 yr. 8 m.	
Number of Calves ...	4		7		3		2	
Last Calved ...	Aug. 4.		Aug. 4.		Mar. 26.		July 30.	
Days since Calving ...	62		62		193		67	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	22·0	19·3	23·0	21·0	19·4	17·8	20·8	22·0
Weight of Milk, 2nd day ...	20·5	18·0	24·8	21·5	21·1	18·6	24·6	21·9
Average ...	21·2	18·6	23·9	21·2	20·2	18·2	22·7	21·9
Percentage Composition of the Milk. Fat ...	4·38	4·89	5·11	5·33	5·16	5·87	3·19	4·58
Percentage Composition of the Milk. Solids other than Fat ...	9·12	8·57	9·77	9·45	9·04	8·89	8·85	9·06
Percentage Composition of the Milk. Solids ...	13·50	13·46	14·88	14·78	14·20	14·76	12·04	13·64
Actual weight of Fat, in lbs. ...	·93	·91	1·22	1·13	1·05	1·07	·72	1·0
Calculation of Points multiply by 20 ...	18·6	18·2	24·4	22·6	21·0	21·4	14·4	20·0
Actual weight of Solids other than Fat, in lbs.	1·93	1·60	2·34	2·0	1·83	1·62	2·0	1·98
Calculation of Points multiply by 4 ...	7·72	6·40	9·36	8·0	7·32	6·48	8·0	7·92
Points: For time since Calving ...	2·2		2·2		12·0		2·7	
Points: For weight of Milk ...	39·8		45·1		38·4		44·6	
Points: For weight of Fat ...	36·8		47·0		42·4		34·4	
Points: For weight of Solids other than Fat	14·1		17·3		13·8		15·9	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	92·9		111·6		106·6		97·6	
Remarks and Awards ...			1st Prize		3rd Prize		High Commendation	

Class 7.—JERSEY COWS—*Continued.*

Number	133		135		136	
Name	Twylish 11th		Glory's Belle		Ladylike	
Age	4 yr. 6 m. 3 w.		6 yr. 8 m.		5 yr. 3 m. 2 w.	
Number of Calves	—		—		—	
Last Calved	April 8.		Aug. 26.		May 20.	
Days since Calving	180		40		138	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	22·0	14·3	17·5	13·7	17·0	14·0
Weight of Milk, 2nd day	20·9	12·2	15·8	12·0	16·9	15·0
Average	21·4	13·2	16·6	12·8	16·9	14·5
Percentage Composition of the Milk. Fat	7·89	5·30	5·67	6·04	4·71	5·95
Percentage Composition of the Milk. Solids other than Fat ...	9·27	9·70	9·27	9·36	9·33	9·41
Percentage Composition of the Milk. Solids	17·16	15·00	14·94	15·40	14·04	15·36
Actual weight of Fat, in lbs.	1·69	·70	·94	·77	·80	·86
Calculation of Points multiply by 20 ...	33·8	14·0	18·8	15·4	16·0	17·2
Actual weight of Solids other than Fat, in lbs.	1·98	1·28	1·54	1·2	1·58	1·36
Calculation of Points, multiply by 4 ...	7·92	5·12	6·16	4·8	6·32	5·44
Points: For time since Calving	12·0		—		9·8	
Points: For weight of Milk	34·6		29·4		31·4	
Points: For weight of Fat	47·8		34·2		33·2	
Points: For weight of Solids other than Fat	13·0		10·9		11·7	
Total	—		—		—	
Deductions ...	—		—		—	
Points gained	107·4		74·5		86·1	
Remarks and Awards	2nd Prize					

CLASS 10.—GUERNSEY COWS.

	174		176		177	
Name	Lady No. 89		Hayes' Olive		Ranunculus 5th	
Age	6 yr. 4 m.		7 yr. 2 m. 3 w.		5 yr. 6 m. 2 w.	
Number of Calves	—		—		—	
Last Calved	July 11.		April 16.		Sept. 6.	
Days since Calving	86		172		29	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	18·6	15·8	15·3	14·2	17·0	14·3
Weight of Milk, 2nd day	19·0	14·4	16·7	13·7	18·0	15·4
Average	18·8	15·1	16·0	13·9	17·5	14·8
Percentage Composition of the Milk: Fat	3·26	3·99	4·68	5·26	4·39	5·59
Percentage Composition of the Milk: Solids other than Fat	8·74	9·01	9·36	9·04	9·69	9·31
Percentage Composition of the Milk: Solids	12·00	13·00	14·04	14·30	14·08	14·90
Actual weight of Fat, in lbs.	·61	·60	·75	·73	·77	·83
Calculation of Points multiply by 20	12·2	12·0	15·0	14·6	15·4	16·6
Actual weight of Solids other than Fat, in lbs.	1·64	1·36	1·50	1·26	1·70	1·38
Calculation of Points multiply by 4	6·56	5·44	6·00	5·04	6·80	5·52
Points: For time since Calving	4·6		12·0		—	
Points: For weight of Milk	33·9		29·9		32·3	
Points: For weight of Fat	24·2		29·6		32·0	
Points: For weight of Solids other than Fat	12·0		11·0		12·3	
Total	—		—		—	
Deductions	—		—		—	
Points gained	74·7		82·5		76·6	
Remarks and Awards						

Class 12.—Red Polled Cows.

Number ...	179		180		181		183	
Name ...	Mona		Honeymne		Queen Mab		Rendlesham Florist	
Age ...	8 yr. 8 m. 4 w.		11 yr. 4 m. 3 w.		5 yr. 3 m. 3 d.		4 yr. 11 m. 1 w.	
Number of Calves ...	6		9		4		3	
Last Calved ...	Aug. 17.		May 3.		May 25.		Aug. 4.	
Days since Calving ...	49		155		133		62	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	31·3	27·0	20·4	17·3	12·6	11·7	20·2	17·3
Weight of Milk, 2nd day ...	33·3	27·6	21·8	17·9	13·1	11·5	20·9	18·1
Average ...	32·3	27·3	21·1	17·6	12·8	11·6	20·5	17·7
Percentage Composition of the Milk. Fat ...	3·23	3·10	3·58	3·96	3·77	4·17	4·29	4·45
Percentage Composition of the Milk. Solids other than Fat ...	9·07	9·04	9·14	9·18	9·27	9·07	9·33	9·25
Percentage Composition of the Milk. Solids ...	12·30	12·14	12·72	13·14	13·04	13·24	13·62	13·70
Actual weight of Fat, in lbs. ...	1·05	·85	·75	·70	·48	·48	·88	·79
Calculation of Points multiply by 20 ...	21·0	17·0	15·0	14·0	9·60	9·60	17·6	15·8
Actual weight of Solids other than Fat, in lbs.	2·93	2·46	1·93	1·62	1·18	1·05	1·91	1·64
Calculation of Points multiply by 4 ...	11·72	9·84	7·72	6·48	4·72	4·20	7·64	6·56
Points: For time since Calving ...	·9		11·5		9·3		2·2	
Points: For weight of Milk ...	59·6		38·7		24·4		38·2	
Points: For weight of Fat ...	38·0		29·0		19·2		33·4	
Points: For weight of Solids other than Fat	21·5		14·2		8·9		14·2	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	120·0		93·4		61·8		88·0	
Remarks and Awards ...	1st Prize Reserve, Red Poll Society's Prize		Reserve and High Commendation					

CLASS 12.—RED POLLED COWS—*Continued.*

Number ...	184		185		186	
Name ...	Sudbourne Queen		Sudbourne Belle Dotty 1st		Rose	
Age ...	5 yr. 11 m. 4 w.		6 yr.		6 yr. 11 m. 2 w.	
Number of Calves ...	4		4		5	
Last Calved ...	April 22.		Sept. 2.		Feb. 5.	
Days since Calving ...	166		33		242	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	23·2	21·0	27·3	24·0	17·8	15·9
Weight of Milk, 2nd day ...	25·4	18·8	27·6	22·2	17·4	17·6
Average ...	24·3	19·9	27·4	23·1	17·6	16·7
Percentage Composition of the Milk. Fat ...	3·95	4·87	3·53	4·20	3·95	4·24
Percentage Composition of the Milk. Solids other than Fat ...	9·31	9·13	9·07	9·00	9·33	9·36
Percentage Composition of the Milk. Solids ...	13·26	14·00	12·60	13·20	13·28	13·60
Actual weight of Fat, in lbs. ...	·96	·97	·97	·97	·70	·70
Calculation of Points multiply by 20 ...	19·2	19·4	19·4	19·4	14·0	14·0
Actual weight of Solids other than Fat, in lbs.	2·27	1·82	2·48	2·08	1·65	1·56
Calculation of Points multiply by 4 ...	9·08	7·28	9·92	8·32	6·60	6·24
Points: For time since Calving ...	12·0		—		12·0	
Points: For weight of Milk ...	44·2		50·5		34·3	
Points: For weight of Fat ...	38·6		38·8		28·0	
Points: For weight of Solids other than Fat	16·3		18·2		12·8	
Total ...	—		—		—	
Deductions ...	—		—		—	
Points gained	111·1		107·5		87·1	
Remarks and Awards ...	2nd Prize		3rd Prize Red Poll Society's Prize			

CLASS 13.—RED POLLED HEIFERS (NOT EXCEEDING THREE YEARS).

Number ...	187		188		189		190	
Name ...	Devote		Ashmoor Miriam		Aspall Pomona		Aspall Princess 1st	
Age ...	2 yr. 8 m.		2 yr. 4 m.		2 yr. 8 m.		2 yr. 7 m. 2 w.	
Number of Calves ...	1		1		—		—	
Last Calved ...	July 13.		Aug. 18.		Sept. 2.		Aug. 30.	
Days since Calving ...	84		48		33		36	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	16·2	13·7	12·6	11·8	19·3	17·6	16·9	15·7
Weight of Milk, 2nd day ...	17·4	14·3	13·2	12·8	19·1	16·5	17·7	14·4
Average ...	16·8	14·0	12·9	12·3	19·2	17·0	17·3	15·0
Percentage Composition of the Milk. Fat ...	3·42	3·43	4·98	4·84	3·37	5·05	3·78	3·93
Percentage Composition of the Milk. Solids other than Fat ...	9·34	9·53	9·88	9·56	9·31	9·01	9·34	9·21
Percentage Composition of the Milk. Solids ...	12·76	12·96	14·86	14·40	12·68	14·06	13·12	13·14
Actual weight of Fat, in lbs. ...	·57	·48	·64	·60	·65	·86	·65	·59
Calculation of Points multiply by 20 ...	11·4	9·6	12·8	12·0	13·0	17·2	13·0	11·8
Actual weight of Solids other than Fat, in lbs.	1·57	1·33	·1·27	1·17	1·78	1·54	1·62	1·38
Calculation of Points multiply by 4 ...	6·28	5·32	5·08	4·68	7·12	6·16	6·48	5·52
Points: For time since Calving ...	4·4		·8		—		—	
Points: For weight of Milk ...	30·8		25·2		36·2		32·3	
Points: For weight of Fat ...	21·0		24·8		30·2		24·8	
Points: For weight of Solids other than Fat	11·6		9·7		13·2		12·0	
Total ...	—		—		—		—	
Deductions ...	—		—		—		—	
Points gained	67·8		60·5		79·6		69·1	
Remarks and Awards ...	High Commendation		High Commendation		1st Prize Reserve, Red Poll Society's Prize		3rd Prize Red Poll Society's Prize	

CLASS 13.—RED POLLED HEIFERS (NOT EXCEEDING THREE YEARS)—*Continued.*

Number ...	191		192		193	
Name ...	Rendlesham Belle		Sudbourne Bess		Sudbourne Dame	
Age ...	2 yr. 11 m. 2 w.		2 yr. 11 m. 1 w.		2 yr. 11 m.	
Number of Calves ...	1		—		—	
Last Calved ...	Sept. 2.		Sept. 13.		Sept. 8.	
Days since Calving ...	33		22		27	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	18·5	17·2	19·0	16·7	15·3	17·0
Weight of Milk, 2nd day ...	20·0	16·6	19·8	17·7	16·0	16·8
Average ...	19·2	16·9	19·4	17·2	15·6	16·9
Percentage Composition of the Milk. — Fat ...	2·85	3·40	3·38	4·06	3·18	4·14
Percentage Composition of the Milk. — Solids other than Fat ...	9·63	9·40	9·42	9·58	9·62	9·46
Percentage Composition of the Milk. — Solids ...	12·48	12·80	12·80	13·64	12·80	13·60
Actual weight of Fat, in lbs. ...	·55	·57	·65	·70	·50	·70
Calculation of Points multiply by 20 ...	11·0	11·4	13·0	14·0	10·0	14·0
Actual weight of Solids other than Fat, in lbs.	1·85	1·60	1·83	1·65	1·50	1·60
Calculation of Points multiply by 4 ...	7·40	6·40	7·32	6·60	6·00	6·40
Points — For time since Calving ...	—		—		—	
Points — For weight of Milk ...	36·1		36·6		32·5	
Points — For weight of Fat ...	22·4		27·0		24·0	
Points — For weight of Solids other than Fat	13·8		13·9		12·4	
Total ...	72·3		—		—	
Deductions ...	10·0		—		—	
Points gained	62·3		77·5		68·9	
Remarks and Awards ...	High Commendation		2nd Prize		Reserve and High Commendation	

Class 14.—AYRSHIRE COWS.

Number ...	194		196	
Name ...	Dot		Dalfibble Bella 2nd	
Age ...	5 yr. 4 m.		8 yr. 11 m. 4 d.	
Number of Calves ...	3		—	
Last Calved ...	July 9.		May 26.	
Days since Calving ...	88		132	
	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	22·6	27·6	10·8	12·2
Weight of Milk, 2nd day ...	27·9	23·6	14·1	14·0
Average ...	25·2	25·6	12·4	13·1
Percentage Composition of the Milk. Fat ...	3·49	3·42	3·13	3·94
Percentage Composition of the Milk. Solids other than Fat ...	8·41	8·42	8·87	8·52
Percentage Composition of the Milk. Solids ...	11·90	11·84	12·00	12·46
Actual weight of Fat, in lbs. ...	·88	·87	·39	·51
Calculation of Points multiply by 20 ...	17·6	17·4	7·8	10·2
Actual weight of Solids other than Fat, in lbs.	2·12	2·16	1·10	1·12
Calculation of Points multiply by 4 ...	8·48	8·64	4·40	4·43
Points: For time since Calving ...	4·8		9·2	
Points: For weight of Milk ...	50·8		25·5	
Points: For weight of Fat ...	35·0		18·0	
Points: For weight of Solids other than Fat	17·1		8·8	
Total ...	107·7		—	
Deductions ...	20·0		—	
Points gained	87·7		61·5	
Remarks and Awards ...				

Class 15.—SOUTH DEVON COWS.

Number	197		198		199		200	
Name	Pansy		Alice		Winsome		Goldencup	
Age	6 yr. 5 m.		8 yr. 5 m.		7 yr.		6 yr. 9 m.	
Number of Calves	—		—		—		—	
Last Calved	April 10.		Aug. 4.		June 30.		June 1.	
Days since Calving	178		52		97		126	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day	15·3	10·2	28·3	25·8	23·3	22·7	23·2	23·3
Weight of Milk, 2nd day	14·8	15·1	27·6	29·2	23·7	24·4	24·0	21·4
Average	15·0	12·6	27·9	27·5	23·5	23·5	23·6	22·3
Percentage Composition of the Milk. — Fat	3·66	2·99	2·71	3·83	3·36	4·05	3·72	4·84
Percentage Composition of the Milk. — Solids other than Fat	8·30	8·33	9·43	9·23	9·56	9·15	9·68	9·12
Percentage Composition of the Milk. — Solids	11·96	11·32	12·14	13·06	12·92	13·20	13·40	13·96
Actual weight of Fat, in lbs.	·55	·37	·75	1·05	·79	·95	·88	1·08
Calculation of Points multiply by 20	11·0	7·4	15·0	21·0	15·8	19·0	17·6	21·6
Actual weight of Solids other than Fat, in lbs.	1·25	1·05	2·64	2·54	2·25	2·15	2·28	2·04
Calculation of Points multiply by 4	5·0	4·20	10·56	10·16	9·0	8·60	9·12	8·16
Points — For time since Calving	12·0		1·2		5·7		8·6	
Points — For weight of Milk	27·6		55·4		47·0		45·9	
Points — For weight of Fat	18·4		36·0		34·8		39·2	
Points — For weight of Solids other than Fat	9·2		20·7		17·6		17·2	
Total	67·2		113·3		—		—	
Deductions	30·0		10·0		—		—	
Points gained	37·2		103·3		105·1		110·9	
Remarks and Awards			High Commendation		High Commendation		Reserve	

Class 15.—SOUTH DEVON COWS—*Continued.*

Number ...	202		203		205	
Name ...	Iris		Fancy 6th		Honesty 7th	
Age ...	9 yr. 7 m.		9 yr. 6 m.		7 yr. 10 m. 1 w.	
Number of Calves ...	—		6		—	
Last Calved ...	July 11.		Aug. 29.		July 2.	
Days since Calving ...	86		37		95	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	30·6	32·2	30·4	27·1	31·1	29·4
Weight of Milk, 2nd day ...	31·3	28·7	31·3	28·5	33·2	32·0
Average ...	30·9	30·4	30·8	27·8	32·1	30·7
Percentage Composition of the Milk. Fat ...	3·38	3·82	3·83	4·02	3·44	3·62
Percentage Composition of the Milk. Solids other than Fat ...	9·42	9·18	9·23	9·22	9·16	9·08
Percentage Composition of the Milk. Solids ...	12·80	13·00	13·06	13·24	12·60	12·70
Actual weight of Fat, in lbs. ...	1·04	1·16	1·18	1·12	1·11	1·11
Calculation of Points multiply by 20 ...	20·8	23·2	23·6	22·4	22·2	22·2
Actual weight of Solids other than Fat, in lbs.	2·91	2·78	2·85	2·56	2·94	2·80
Calculation of Points multiply by 4 ...	11·64	11·12	11·40	10·24	11·76	11·20
Points: For time since Calving ...	4·6		—		5·5	
Points: For weight of Milk ...	61·3		58·6		62·8	
Points: For weight of Fat ...	44·0		46·0		44·4	
Points: For weight of Solids other than Fat	22·7		21·6		22·9	
Total ...	—		—		—	
Deductions ...	—		—		—	
Points gained	132·6		126·2		135·6	
Remarks and Awards ...	2nd Prize		3rd Prize		1st Prize	

Class 16.—KERRY COWS.

Number ...	206		207		208	
Name ...	Buckhurst Peaceful		Buckhurst (Waterville) Saffhire		Walton Bashful	
Age ...	11 yr. 2 m. 1 w.		11 yr.		6 yr.	
Number of Calves ...	8		7		4	
Last Calved ...	Aug. 23.		July 21.		Sept. 6.	
Days since Calving ...	43		76		29	
	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	21·3	24·0	17·4	16·5	20·0	18·9
Weight of Milk, 2nd day ...	23·4	20·3	19·6	16·9	18·0	19·2
Average ...	22·3	22·1	18·5	16·7	19·0	19·0
Percentage Composition of the Milk. Fat ...	3·86	5·05	4·60	5·14	3·66	4·25
Percentage Composition of the Milk. Solids other than Fat ...	9·24	8·85	9·34	9·14	8·62	8·59
Percentage Composition of the Milk. Solids ...	13·10	13·90	13·94	14·28	12·28	12·84
Actual weight of Fat, in lbs. ...	·86	1·12	·85	·86	·69	·81
Calculation of Points multiply by 20 ...	17·2	22·4	17·0	17·2	13·8	16·2
Actual weight of Solids other than Fat, in lbs.	2·06	1·96	1·73	1·53	1·64	1·64
Calculation of Points multiply by 4 ...	8·24	7.84	6·92	6·12	6·5	6·56
Points. For time since Calving ...	·3		3·6		—	
Points. For weight of Milk ...	44·4		35·2		38·0	
Points. For weight of Fat ...	39·6		34·2		30·0	
Points. For weight of Solids other than Fat	16·0		13·0		13·1	
Total ...	—		—		—	
Deductions ...	—		—		—	
Points gained	100·3		86·0		81·1	
Remarks and Awards ...	1st Prize		2nd Prize		Reserve and High Commendation.	

Class 23.—GOATS.

Number ...	272		273		275		276	
Name ...	Blossom		Sedgemere Cravate		Copthorne March		Tally-Ho Margot	
Age ...	8 yr. 4 m. 2 w.		4 yr. 6 m.		7 yr. 6 m.		4 yr.	
Number of Kids ...	14		—		—		—	
Last Kidded ...	March 28.		March 21.		April 13.		March 11.	
Days since Kidding ...	191		198		175		208	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	2·2	1·6	2·6	2·2	2·9	2·6	2·6	2·2
Weight of milk, 2nd day ...	1·8	1·2	2·6	2·2	3·3	2·9	2·8	2·4
Average ...	2·0	1·4	2·6	2·2	3·1	2·7	2·7	2·3
Percentage Composition of the Milk. Fat ...	5·67	5·81	2·45	2·18	2·56	2·20	2·85	3·05
Percentage Composition of the Milk. Solids other than Fat ...	9·27	9·35	8·75	8·72	8·38	8·40	8·19	8·45
Percentage Composition of the Milk. Solids ...	14·94	15·16	11·20	10·90	10·94	10·60	11·04	11·50
Actual weight of Fat, in lbs. ...	·113	·081	·064	·048	·079	·060	·077	·070
Calculation of Points multiply by 20 ...	2·26	1·62	1·28	·96	1·58	1·2	1·54	1·4
Actual weight of Solids other than Fat, in lbs.	·185	·131	·228	·192	·260	·227	·221	·195
Calculation of Points multiply by 4 ...	·740	·524	·912	·768	1·04	·908	·884	·780
Points: For time since Kidding ...	3·18		3·30		2·91		3·46	
Points: For weight of Milk ...	3·40		4·80		5·80		5·00	
Points: For weight of Fat ...	3·88		2·24		2·78		2·94	
Points: For weight of Solids other than Fat	1·26		1·68		1·94		1·66	
Total ...	—		12·02		13·43		13·06	
Deductions ...	—		2·0		2·00		2·00	
Points gained	11·72		10·02		11·43		11·06	
Remarks and Awards ...	3rd Prize		High Commendation		High Commendation		High Commendation	

CLASS 23.—GOATS—*Continued.*

Number ...	280		283		285		293	
Name ...	Sparkie		Bricket Tattle		Recluse		Killerton Pink Pearl	
Age ...	7 yr.		2 yr. 8 m. 1 w.		3 yr. 6 m. 2 w.		2 yr. 6 m. 1 w.	
Number of Kids ...	—		2		7		2	
Last Kidded ...	March 4.		Jan. 23.		April 6.		May 6.	
Days since Kidding ...	215		255		182		152	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	1·7	1·3	1·6	1·1	2·0	1·6	1·5	1·1
Weight of Milk, 2nd day ...	1·8	1·3	1·5	1·2	1·5	1·8	1·5	1·2
Average ...	1·7	1·3	1·5	1·1	1·7	1·7	1·5	1·1
Percentage Composition of the Milk. Fat ...	3·70	2·89	6·37	5·77	5·65	5·78	5·40	5·40
Percentage Composition of the Milk. Solids other than Fat ...	9·48	9·47	9·53	10·67	9·17	9·52	8·52	9·14
Percentage Composition of the Milk. Solids ...	13·18	12·36	15·90	16·44	14·82	15·30	13·92	14·54
Actual weight of Fat, in lbs. ...	·063	·037	·095	·063	·096	·098	·081	·059
Calculation of Points multiply by 20 ...	1·26	·74	1·90	1·26	1·92	1·96	1·62	1·18
Actual weight of Solids other than Fat, in lbs.	·161	·123	·143	·118	·156	·162	·128	·100
Calculation of Points multiply by 4 ...	·644	·492	·572	·472	·624	·648	·512	·400
Points: For time since Kidding ...	3·58		4·25		3·03		2·53	
Points: For weight of Milk ...	3·00		2·60		3·40		2·60	
Points: For weight of Fat ...	2·00		3·16		3·88		2·80	
Points: For weight of Solids other than Fat	1·13		1·04		1·27		·91	
Total ...	9·71		—		—		—	
Deductions ...	2·00		—		—		—	
Points gained	7·71		11·05		11·58		8·84	
Remarks and Awards ...			High Commendation		Reserve			

CLASS 23.—GOATS—*Continued.*

Number ...	294		295		296		300	
Name ...	Copthorne Orange		Halton Heroine		Loxwood Lymingtona		Killerton Garnet	
Age ...	3 yr. 6 m.		2 yr. 7 m.		2 yr. 5 m.		2 yr. 2 m. 2 w.	
Number of Kids ...	—		—		4		2	
Last Kidded ...	March 19.		May 30.		July 11.		July 14.	
Days since Kidding ...	200		128		86		83	
	Morn	Even	Morn	Even	Morn	Even	Morn	Even
Weight of Milk, 1st day ...	3·5	3·2	2·3	2·5	1·9	1·4	2·8	2·4
Weight of Milk, 2nd day ...	3·5	3·5	2·9	2·7	1·4	1·2	3·0	2·4
Average ...	3·5	3·3	2·6	2·6	1·6	1·3	2·9	2·4
Percentage Composition of the Milk. Fat ...	2·31	2·33	3·05	2·92	6·80	5·68	4·98	5·19
Percentage Composition of the Milk. Solids other than Fat ...	8·15	8·15	8·97	9·08	9·42	9·22	8·84	8·85
Percentage Composition of the Milk. Solids ...	10·46	10·48	12·02	12·00	16·22	14·90	13·82	14·04
Actual weight of Fat, in lbs. ...	·081	·077	·079	·076	·109	·074	·144	·125
Calculation of Points multiply by 20 ...	1·62	1·54	1·58	1·52	2·18	1·48	2·88	2·50
Actual weight of Solids other than Fat, in lbs.	·285	·270	·234	·236	·151	·120	·256	·212
Calculation of Points multiply by 4 ...	1·140	1·080	·936	·944	·604	·480	1·024	·848
Points: For time since Kidding ...	3·33		2·13		1·43		1·38	
Points: For weight of Milk ...	6·80		5·20		2·90		5·30	
Points: For weight of Fat ...	3·16		3·10		3·66		5·38	
Points: For weight of Solids other than Fat	2·22		1·88		1·08		1·87	
Total ...	15·51		12·31		—		—	
Deductions ...	2·0		2·0		—		—	
Points gained	13·51		10·31		9·07		13·93	
Remarks and Awards ...	2nd Prize and Baroness Burdett Coutts' Cup		High Commendation				1st Prize	

CLASS 23.—GOATS—*Continued.*

Number	302	
Name	Zulieka 2nd	
Age	4 yr. 3 m. 3 w.	
Number of Kids	6	
Last Kidded	April 27.	
Days since Kidding	161	
	Morn	Even
Weight of Milk, 1st day	1·4	1·1
Weight of Milk, 2nd day	1·6	1·5
Average	1·5	1·3
Percentage Composition of the Milk. Fat	3·89	6·75
Percentage Composition of the Milk. Solids other than Fat	9·37	9·41
Percentage Composition of the Milk. Solids	13·26	16·16
Actual weight of Fat, in lbs.	·058	·088
Calculation of Points multiply by 20	1·16	1·76
Actual weight of Solids other than Fat, in lbs.	·141	·122
Calculation of Points multiply by 4	·564	·488
Points: For time since Kidding	2·68	
Points: For weight of Milk	2·80	
Points: For weight of Fat	2·92	
Points: For weight of Solids other than Fat	1·05	
Total	9·45	
Deductions	1·0	
Points gained	8·45	
Remarks and Awards		

THE BUTTER TESTS FOR 1910.

By R. H. Evans, B.Sc.

The butter tests for 1910 were carried out on the same lines as in previous years.

Of 79 cows entered for the various prizes offered in this section, only 62 were present—an increase of one over the 1909 figure. All the more important dairy breeds were represented with the exception of Dutch, Kerries, and Welsh.

The cows were milked at out 5.30 p.m. on the Tuesday, and the milk produced between that time and 5.30 p.m. on the Wednesday—a period of 24 hours—was taken for the purpose of the Butter Test competition. Separating was carried out as soon as possible after the milk was received; the evening's cream was added to that obtained in the morning, and the mixed cream of each cow allowed to stand overnight. Churning commenced 8.30 a.m. Thursday morning.

As compared with last year's cream, that obtained at the 1910 Show proved on the whole more difficult to churn. Great difficulty was experienced in getting the cream of several cows to yield up its butter. This is to be expected in the case of those cows which are of a nervous disposition, and which are highly fed for milk-production. The cream obtained from the Jersey cows was by far the most churnable, while the butter yielded by these cows was of a much more even quality as regards both colour and texture.

In the Shorthorn class several cows yielded very pale-coloured and oily-textured butter. Exhibitors must experience great difficulty in forcing their cattle for milk-production and at the same time keeping up the colour and quality of the butter yielded.

According to the present scale of points in the Butter Test contests, it is possible for a cow yielding very inferior butter to obtain a prize. This has often been the case in past years, and I would suggest that some steps be taken to consider the advisability of giving points for both colour and quality of the butter yielded, in addition to those already awarded for quantity and lactation. Under the present scale of points a cow yielding 2 lbs. 2 ozs. of very poor butter would be awarded a premier prize to an animal yielding only 2 lbs. 1½ ozs., excellent both in colour and quality—assuming, of course, that their points for lactation are the same.

In the accompanying tables the performance of the various breeds of animals competing are compared. In order to draw a comparison from year to year between the total number of animals exhibited, the following figures will prove interesting:—

The average number of points for the 61 cows tested in 1909 was 33·3.

The average number of points for the 62 cows tested in 1910 was 32·5.

The total milk yield of the 61 cows tested in 1909 was 2,561 lbs., approximately 256 gallons. This shows an average of 42 lbs. per cow per day—practically 4 gallons.

The total milk yield of the 61 cows tested in 1910 was 2,750 lbs., approximately 275 gallons; an average of 44 lbs. per head per day.

In 1909, 61 cows yielded 109 lbs. 10¼ ozs. of butter, an average of 1 lb. 12¾ ozs. per cow. The 62 cows tested in 1910 yielded 109 lbs. 13½ ozs., an average of 1 lb. 12½ ozs.

The total amount of butter fat, as shown by chemical analysis, in 1909 (for 58 cows) was 104·18 lbs., showing an average of 1·79 lbs. per cow per day. In 1910, 60 cows yielded 112·5 lbs. butter fat, or an average of 1·87 lbs. per head per day, a figure slightly in excess of that of 1909.

My best thanks are due to my colleagues (Messrs. Hammond and Crawfurd, representing the English Jersey Cattle Society) for the kind assistance in the carrying out of the 1910 Butter Tests.

BUTTER TESTS—SHORTHORNS.

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf		Number of days in Milk.	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total. lbs	ozs	Butter Yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter: Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards.
1	G. I. Tyser's Lady Lee 2 st	8	8	0	Aug.	6	60	20	6	25	10	56	0	1	10½	33·81	Ex.	Ex.	26·50	2·00	28·50	
2	S. Sanday's Eaglethorpe Amy 5th	6	1	2	Aug.	21	45	27	3	29	14	57	1	1	6½	40·57	V. Good	Ex.	22·50	0·50	23·00	
5	Tom Hunter's Ursulina 2nd	5	4	2	Sept.	18	17	27	11	23	6	51	1	2	3¼	23·17	Ex.	V. Good	35·25	—	35·25	H. Commended
12	J. Ellis Potter's Lady Heggle	8	6	1	Sept.	1	34	31	13	26	3	58	0	2	10¼	21·96	VGood	VGood	42·25	—	42·25	2nd Prize and Bronze Medal
13	F. J. Stanhope's Princess Ena	7	1	0	July	28	69	24	3	25	10	49	13	2	14½	17·13	VPale	VGood	46·50	2·90	49·40	1st Prize and Silver Medal
21	George Taylor's Darlington Cranford 22nd	5	6	0	Sept.	5	30	27	6	27	15	55	5	1	7¾	37·26	Pale	Good	23·75	—	23·75	
23	George Taylor's Wild Cran 15th	3	11	0	Sept.	3	32	23	13	23	5	47	2	1	1¾	42·47	Pale	Good	17·75	—	17·75	
52	Tom Hunter's Madge ...	6	0	0	Sept.	10	25	25	10	25	0	50	10	2	2¾	23·30	V. Pale	Good	34·75	—	34·75	H. Commended
53	A. Andrew's Mossie ...	6	3	2	June	23	104	17	7	18	3	35	10	1	3¼	29·61	Good	Ex.	19·25	6·40	25·65	
54	A. Andrew's Susan ...	10	0	0	July	15	82	20	0	17	7	37	7	1	5½	27·86	V. Good	Ex.	21·50	4·20	25·70	
55	A. P. Brandt's Primrose	6	6	0	July	8	89	29	8	23	7	52	15	2	5¼	22·73	Ex.	V. Good	37·25	4·90	42·15	R. & V. H. Commended
57	J. & R. Atkinson's Milk Maid	unknown			Sept.	7	28	25	8	23	14	49	6	1	6¾	34·72	VPale	VGood	22·75	—	22·75	
58	J. & R. Atkinson's Buttercup	unknown			Sept.	4	31	21	0	19	13	40	13	2	3¼	18·52	V. Pale	Good	35·25	—	35·25	H. Commended
59	A. J. Hollington's Matchless	8	0	0	Aug.	27	39	37	0	32	6	69	6	2	2½	32·17	VGood	VGood	34·50	—	34 50	H. Commended
60	Geo. B. Nelson's Phyllis	7	0	0	July	20	77	25	3	24	3	49	6	2	1½	23·58	Good	Good	33·50	3·70	37·20	H. Commended

BUTTER TESTS—SHORTHORNS—*Continued.*

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf		Number of days in Milk.	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total lbs	ozs	Butter Yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter: Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards
61	Geo. B. Nelson's Lady Wilson	7	0	0	Sept.	9	26	33	10	29	13	63	7	2	0½	31·23	Ex.	Ex.	32 50	—	32·50	H. Commended
62	Geo. B. Nelson's Strawberry	6	0	0	Sept.	4	31	22	11	22	8	45	3	1	15¼	23·13	VGood	VGood	31·25	—	31·25	
65	Sam S. Raingill's Dot ...	5	0	0	Sept.	17	18	26	8	23	8	50	0	1	13¼	27·35	V.Good	Good	29·25	—	29·25	
69	J. L. Shirley's Pride ...	7	0	0	Sept.	6	29	32	6	30	10	63	0	1	15¾	31·74	V.Pale	Good	31·75	—	31·75	
70	J. L. Shirley's Alice ...	7	0	0	Sept.	10	25	25	5	24	11	50	0	1	9¼	31·68	Pale	Good	25·25	—	25·25	
72	J. F. Spencer's Maggie May	5	0	0	Sept.	16	19	25	10	22	11	48	5	1	7½	32·89	Pale	V.Good	23·50	—	23·50	
74	E. S. Godsell's Milkmaid	6	0	0	Aug.	28	38	35	5	31	2	66	7	2	7¼	27·08	VGood	VGood	39·25	—	39·25	H. Commended
91	A. P. Brandt's Stenigot Bloom 10th	6	6	0	June	2	125	16	13	14	8	31	5	1	3	26·36	Ex.	Ex.	19·00	8·50	27·50	
92	G. Ll. Palmer's Bracebridge 79B	4	9	10	Sept.	19	16	26	10	21	2	47	10	1	12	27·28	V.Good	Good	28 00	—	28·00	H. Commended
93	C. E. Scorer's Panton No. 206	9	0	0	May	1	157	31	3	18	3	39	6	1	10¾	23·55	Pale	V.Good	26·75	11·70	38·45	H. Commended
94	C. E. Scorer's Bracebridge No. 3B	6	11	0	June	12	115	27	10	24	2	51	12	1	13½	28·07	Good	V.Good	29·50	7·50	37·00	H. Commended
95	John Evens' Burton Quality 5th	5	8	0	Aug.	25	41	22	11	21	0	43	11	1	14	23·30	Ex.	V. Good	30·00	0·10	30·10	
96	John Evens' Burton Ruby 12th	4	10	0	Sept.	19	16	27	5	25	14	53	3	1	12¼	30·12	Good	Good	28·25	—	28·25	H. Commended
97	John Evens' Burton Fuchsia 3rd	8	0	0	May	25	133	29	8	26	2	55	10	2	0¼	27·59	Good	Good	32·25	9 30	41·55	V. H. Commended
98	John Evens' Burton Ruby Spot 2nd	9	5	0	Sept.	3	32	20	3	20	8	40	11	1	4¼	32·14	Fair	Good	20·25	—	20·25	

BUTTER TESTS—SHORTHORNS—*Continued.*

No. in Catalogue	Name of Cow	CHURNING—TIME AND TEMPERATURE.					
		Time			Temperature		
		Churning began	Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished
				Minutes	Degrees	Degrees	Degrees
1	Lady Lee 21st	8 37 a.m.	9 23 a.m	46	67	52	58
2	Eaglethorpe Amy 5th	8 37 ,,	9 10 ,,	33	67	52	57
5	Ursulina 2nd	8 55 ,,	9 45 ,,	50	67	52	58
12	Lady Heggle	8 45 ,,	9 28 ,,	43	67	52	58
13	Princess Eua	8 43 ,,	9 0 ,,	17	67	52	55
21	Darlington Cranford 22nd	8 48 ,,	9 30 ,,	42	67	52	59
23	Wild Cran 15th	8 50 ,,	9 25 ,,	35	67	52	56
52	Madge	8 46 ,,	9 5 ,,	19	66	52	54
53	Mossie	9 14 ,,	9 35 ,,	21	67	52	59
54	Susan	9 12 ,,	9 40 ,,	28	67	52	59
55	Primrose	9 40 ,,	10 15 ,,	35	67	52	57
57	Milk Maid	9 18 ,,	9 45 ,,	27	67	52	58
58	Buttercup	10 40 ,,	11 15 ,,	35	71	52	57
59	Matchless	10 23 ,,	11 23 ,,	60	71	52	59
60	Phyllis	10 50 ,,	11 50 ,,	60	70	52	61
61	Lady Wilson	9 28 ,,	10 5 ,,	37	67	52	55
62	Strawberry	9 45 ,,	10 30 ,,	45	69	52	57
65	Dot	9 45 ,,	10 6 ,,	21	69	52	57
69	Pride	9 50 ,,	10 10 ,,	20	69	52	59
70	Alice	10 5 ,,	10 40 ,,	35	69	52	58
72	Maggie May	10 34 ,,	11 16 ,,	42	70	52	57
74	Milkmaid	9 55 ,,	10 40 ,,	45	71	52	57
91	Stenigot Bloom 10th	9 56 ,,	10 42 ,,	46	69	52	57
92	Bracebridge 79B	9 50 ,,	10 12 ,,	22	71	52	56
93	Panton No. 206	10 2 ,,	10 45 ,,	43	70	52	60
94	Bracebridge No. 3B	10 54 ,	11 45 ,,	51	70	52	60
95	Burton Quality 5th	10 50 ,,	11 30 ,,	40	70	52	52
96	Burton Ruby 12th	12 0 noon	12 20 p.m.	20	72	52	52
97	Burton Fuchsia 3rd	11 30 a.m.	12 32 ,,	62	72	52	59
98	Burton Ruby Spot 2nd	11 35 ,,	12 15 ,,	40	72	52	58

BUTTER TESTS—JERSEYS.

No. in Catalogue	Exhibitor and Name of Cow	Date of Birth	Date of last Calf	No. of Days in milk	Milk yield in 24 hrs.		Butter Yield		Ratio, viz., lbs. milk to lbs. butter.	Colour and Quality of Butter		No. of Points for butter	No. of Points for period of Lactation	Total number of Points	Awards
										Colour	Quality				
			1910		lbs	ozs	lbs	ozs							
109	A. Miller-Hallett's Goddington Vanilla	April 7, 1906	June 18	109	32	7	1	9½	20·35	Good	Fair	25·50	6 90	32·40	Certificate of Merit
112	Baron Van Haeften's Tuddies' Queen 2nd	April 24, 1903	June 16	111	35	5	2	5½	15·06	V. Good	Good	37·50	7·10	44·60	Certificate of Merit
117	J. Brutton's Irish Lass	Aug. 12, 1904	Mar. 7	212	35	2	2	1	17·03	Good		33·00	12·00	45·00	Certificate of Merit
118	Mrs. Evelyn's Duckwing	Dec. 22, 1901	April 15	173	40	0	2	0	20·00	Excellent		32·00	12·00	44·00	Certificate of Merit & £1 Butter Prize
119	Mrs. Evelyn's Venus	Sept. 4, 1905	June 30	97	37	7	1	15¼	19·16	Very Good		31·25	5·70	36·95	Certificate of Merit
121	A. Pocock's Freegrove Lily	Jan. 5, 1905	April 21	167	35	15	2	1¾	16·74	Very Good		33 75	12·00	45·75	3rd Prize, Bronze Medal, and £3
122	T. French's Darling 2nd	Mar. 2, 1901	Mar. 31	188	24	5	1	11¼	14·27	Good	V. Good	27·25	12·00	39·25	Certificate of Merit
125	Sir J. M. Fuller's Golden Jolly's Pet	1906	May 2	156	20	8	1	4¾	15·80	Ex.	V. Good	20·75	11·60	32·35	Certificate of Merit
126	Earl Cadogan's Ghezireh	April 9, 1905	April 8	180	35	15	2	3	16·42	Good		35 00	12 00	47·00	1st Prize & E.J.C.S. Gold Medal
127	Earl Cadogan's Burgh Mabel ...	May 8, 1904	Aug. 4	62	41	5	1	15¼	21·15	Good		31·25	2 20	33·45	
128	J. H. Smith-Barry's Marigold ...	June 7, 1901	Aug. 4	62	44	0	2	4½	19·28	Ex.	Good	36 50	2 20	38·70	Certificate of Merit
129	J. H. Smith-Barry's Malmsey ...	Aug. 12, 1905	Mar. 26	193	37	4	1	13¾	20 03	Good	Fair	29 75	12·00	41·75	Certificate of Merit
30	J. H. Smith-Barry's New Year's Gift	Jan. 1, 1907	July 30	67	42	13	1	7½	29 14	Good	Fair	23 50	2 70	26·20	

BUTTER TESTS—JERSEYS—*Continued.*

No. in Catalogue	Exhibitor and Name of Cow	Date of Birth	Date of last Calf	No. of Days in milk	Milk yield in 24 hrs. lbs	Milk yield in 24 hrs. ozs	Butter Yield lbs	Butter Yield ozs	Ratio, viz., lbs. milk to lbs. butter	Colour and Quality of Butter: Colour	Colour and Quality of Butter: Quality	No. of Points for butter	No. of Points for period of Lactation	Total number of Points	Awards
133	Lord Rothschild's Twylish 11th ...	1906	1910 April 8	180	36	5	2	2	17·08	Good	Fair	34·00	12·00	46·00	2nd Prize, E.J.C.S. Silver Medal, & £5
135	R. H. Cobb's Glory's Belle	Dec. 28, 1903	Aug. 26	40	31	4	1	15½	15·87	Very Good		31·50	Nil.	31·50	
136	Mrs. Gwynne Holford's Ladylike ...	May 11, 1905	May 20	138	31	0	1	7½	21·10	V. Good	Good	23·50	9·80	33·30	
142	C. E. Kayler's Leonora	Sept. 30, 1908	Sept. 2	33	24	13	1	6	18·04	—		22·00	Nil.	22·00	
146	G. Berry's Nimrod's Dinah	1908	Aug. 5	61	27	15	1	8¾	18·06	Good	Ex.	24·75	2 10	26·85	

BUTTER TESTS—JERSEYS—*Continued.*

No. in Catalogue	Name of Cow	CHURNING—TIME AND TEMPERATURE.					
		Time			Temperature		
		Churning began	Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished
				Minutes	Degrees	Degrees	Degrees
109	Goddington Vanilla	8 32 a.m.	9 22a.m.	50	65	52	57
112	Tuddies' Queen 2nd	8 38 ,,	9 21 ,,	43	65	52	55
117	Irish Lass	8 43 ,,	9 49 ,,	66	65	52	59
118	Duckwing	8 47 ,,	9 40 ,,	53	65	52	57
119	Venus	9 40 ,,	10 29 ,,	49	68	52	58
121	Freegrove Lily	10 1 ,,	10 58 ,,	57	69	52	58
122	Darling 2nd	9 47 ,,	10 30 ,,	43	69	52	58
125	Golden Jolly's Pet	10 46 ,,	11 17 ,,	31	70	52	57
126	Ghezireh	10 40 ,,	11 4 ,,	24	70	52	58
127	Burgh Mabel	11 15 ,,	11 58 ,,	23	71	52	59
128	Marigold	10 53 ,,	11 20 ,,	27	70	52	57
129	Malmsey	11 30 ,,	12 12p m.	42	71	52	59
130	New Year's Gift	11 56 ,,	12 48 ,,	52	72	52	60
133	Twylish 11th	12 32p.m.	1 3 ,,	31	73	52	58
135	Glory's Belle	12 36 ,,	1 24 ,,	48	73	52	58
136	Ladylike	11 20a.m.	11 44a.m.	24	71	52	57
142	Leonora	11 41 ,,	12 21p.m.	40	72	52	58
146	Nimrod's Dinah	12 20p.m.	1 25 ,,	65	73	52	60

BUTTER TESTS—OTHER BREEDS.

No. in Catalogue	Exhibitor and Name of Cow	Age on Sept. 1st y.	m.	w.	Date of last Calf		Number of days in Milk.	Milk Yield Morn. lbs	ozs	Even. lbs	ozs	Total lbs	ozs	Butter Yield lbs	ozs	Ratio, viz., lbs. Milk to lbs. Butter	Colour and Quality of Butter: Colour	Quality	No. of Points for Butter	No. of Points for Lactation	Total number of Points	Awards
174	Sir H. F. Lennard's Lady No. 89	6	4	0	July	11	86	18	10	15	13	34	7	1	3¾	27·89	VGood	VGood	19·75	4·60	24·35	
177	H. Fitzwalter Plumptre's Ranunculus 5th	5	6	2	Sept.	6	29	17	0	14	5	31	5	1	3½	26·20	V. Good	Good	19·50	—	19·50	
179	Earl of Radnor's Mona...	8	8	4	Aug.	17	49	31	5	27	0	58	5	1	6½	41·46	VPale	VGood	22·50	0·90	23·40	
180	Earl of Radnor's Honeymine	11	4	3	May	3	155	20	6	17	5	37	11	1	2¼	33·04	Pale	Good	18.25	11·50	29·75	
183	A. Carlyle Smith's Rendlesham Florist	4	11	1	Aug.	4	62	20	3	17	5	37	8	1	9¼	23·76	Pale	Good	25·25	2·20	27·45	
188	A. Carlyle Smith's Ashmoor Miriam	2	4	0	Aug.	18	48	12	10	11	13	24	7	1	0	24·07	Pale	Good	16·00	0·80	16·80	
194	Tom Hunter's Dot ...	5	4	0	July	9	88	22	10	27	10	50	4	1	15	25·93	V.Good	Good	31·00	4·80	35·80	Prize of £3
197	W. & H. Whitley's Pansy	6	5	0	April	10	178	15	5	10	3	25	8	0	12¾	32·00	V.Good	Good	12·75	12·00	24·75	
198	W. & H. Whitley's Alice	8	5	0	Aug.	14	52	28	5	25	13	54	2	1	12	30·92	Good	V.Good	28·00	1·20	29·20	
199	W. &. H. Whitley's Winsome	7	0	0	June	30	97	23	5	22	11	46	0	1	6	33·45	Ex.	V. Good	22·00	5·70	27·70	
200	Thos. Cundy's Goldencup	6	9	0	June	1	126	23	3	23	5	46	8	2	0	23·25	Ex.	V. Good	32·00	8·60	40·60	Prize of £3
202	Thos. Cundy's Iris ...	9	7	0	July	11	86	30	10	32	3	62	13	1	13¾	33·78	Ex.	V. Good	29·75	4·60	34·35	H. Commended
203	W. P. Vosper's Fancy 6th	9	6	0	Aug.	29	37	30	6	27	2	57	8	2	5¼	24·69	Good	V.Good	37·25	—	37·25	2nd Prize, £1
205	S. Vosper's Honesty 7th	7	10	1	July	2	95	31	2	29	6	60	8	1	14¾	31·47	VGood	VGood	30·75	5·50	36·25	R. & H. Commended

BUTTER TESTS—OTHER BREEDS.

No. in Catalogue	Name of Cow	Churning began	CHURNING—TIME AND TEMPERATURE.				
			Time			Temperature	
			Churning finished	Duration of Churning	Dairy	Cream and Churn	Buttermilk, when churning finished
				Minutes	Degrees	Degrees	Degrees
174	Lady No. 89	12 7 p.m.	12 40 p.m.	33	73	52	62
177	Ranunculus 5th	11 15 a.m.	11 45 a.m.	30	71	52	59
179	Mona	12 3 p.m.	12 45 p.m.	42	73	52	59
180	Honeymine	11 30 a.m.	11 55 a.m.	25	71	52	58
183	Rendlesham Florist	11 52 ,,	12 47 p.m.	55	71	52	60
188	Ashmoor Miriam	11 40 ,,	12 15 ,,	35	71	52	58
194	Dot	12 0 noon	12 40 ,,	40	74	52	62
197	Pansy	12 0 ,,	1 0 ,,	60	74	52	59
198	Alice	12 24 p.m.	1 5 ,,	41	73	52	59
199	Winsome...	12 32 ,,	1 15 ,,	43	74	52	60
200	Goldencup	12 35 ,,	1 5 ,,	30	74	52	57
202	Iris	12 55 ,,	1 45 ,,	50	74	52	61
203	Fancy 6th	1 2 ,,	1 45 ,,	43	74	52	58
205	Honesty 7th	12 50 ,,	1 50 ,,	60	74	52	64

Table I.—Number of Cattle Tested Since 1897.

Breed	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Shorthorns	9	23	21	22	15	31	18	14	17	22	26	26	19	22
Lincoln Reds	—	—	—	—	—	—	—	—	—	—	7	9	8	8
Jerseys	14	17	15	29	25	30	20	12	18	13	13	16	22	18
Guernseys	3	5	4	7	8	1	5	3	3	2	2	2	2	2
Red Polls ...	7	4	9	7	2	6	5	4	11	12	11	3	4	4
Ayrshires ...	3	1	2	—	1	1	—	1	3	2	—	4	—	1
Sth Devons	—	—	—	—	—	—	2	2	3	5	—	—	4	7
Dutch	1	—	—	—	—	—	1	—	—	—	—	—	—	—
Kerries and Dexters	—	1	2	—	1	2	—	2	1	2	2	5	2	—
Welsh	—	1	1	1	—	—	—	—	—	—	—	—	—	—
Cross-breds	4	1	6	2	2	11	8	6	8	10	—	—	—	—
	41	53	60	68	54	82	59	44	64	68	61	65	61	62

TABLE II.—NUMBER OF CATTLE OF THE VARIOUS BREEDS TESTED SINCE 1895, WITH THEIR AVERAGE PERIOD OF LACTATION, WEIGHT OF BUTTER, BUTTER RATIOS, AND POINTS.

Year	No.	Breed	Average No. of Days in Milk	Average Weight of Butter		Average Butter Ratio	Average No. of Points
				lbs.	ozs.	lbs.	
From 1895 to 1900	106	Shorthorns ...	50½	1	11	28·81	—
1901	15	„ ...	44	2	0½	26·69	33·69
1902	31	„ ...	50	1	11½	27·38	23·89
1903	18	„ ...	41	1	11	38·59	28·44
1904	14	„ ...	41½	1	10	29·31	27·47
1905	17	„ ...	53	1	13½	27·65	31·25
1906	22	„ ...	58	1	6¾	32·87	25·08
1907	26	„ ...	62	1	11¾	29·23	30·24
1908	*35	„ ...	49	1	11	29·39	28·05
1909	19	„ ...	54	1	14	27·25	32·31
1910	22	„ ...	43	1	13½	27·53	31·39
„ 1907	7	Lincoln Reds	57	1	13½	28·31	31·91
1908	9	„ ...	61	1	12	28·00	30·60
1909	8	„ ...	44	1	14¾	24·81	32·09
1910	8	„ ...	79	1	10¾	27·15	31·39
„ 1895 to 1900	126	Jerseys ...	99	1	10¼	19·15	—
1901	25	„ ...	141	1	9½	17·80	34·44
1902	30	„ ...	124	1	10	18·46	33·19
1903	20	„ ...	141	1	11	18·12	36·13
1904	12	„ ...	117	1	13½	19·62	36·79
1905	18	„ ...	134	1	10¾	19·48	35·51
1906	13	„ ...	119	1	10¼	20·89	33·49
1907	13	„ ...	111	1	11	19·71	34·49
1908	16	„ ...	115	1	7¼	22·35	30·00
1909	22	„ ...	116	1	13½	18·36	37·12
1910	18	„ ...	123	1	13½	18·43	37·05
„ 1895 to 1900	23	Guernseys ...	71¾	1	9½	21·86	—
1901	8	„ ...	81	1	8¾	21·43	29·51
1902	1	„ ...	17	1	3¾	21·46	19·75
1903	5	„ ...	52	1	1	27·77	18·93
1904	3	„ ...	98¼	1	10	20·65	31·91
1905	3	„ ...	165⅔	1	6¾	19·66	31·78
1906	2	„ ...	138	1	3¼	27·00	28·45
1907	2	„ ...	82	1	12½	18·90	33·48
1908	2	„ ...	142	1	13½	19·47	37·90
1909	2	„ ...	66	1	9½	21·13	28·27
1910	2	„ ...	57	1	3¾	26·80	21·93
„ 1895 to 1900	30	Red Polls ...	60½	1	4¾	30·29	—
1901	2	„ ...	80	1	8⅝	25·50	28·77
1902	6	„ ...	83	1	6⅛	26·84	26·92
1903	5	„ ...	124	1	0	39·60	21·39
1904	4	„ ...	115½	1	5½	30·34	29·06
1905	11	„ ...	74½	1	3½	28·78	22·76
1906	12	„ ...	76	0	15	39·15	18·81
1907	11	„ ...	99	1	2¼	33·21	23·96
1908	3	„ ...	92	1	1	35·00	22·16
1909	4	„ ...	86	1	4½	32·73	25·37
1910	4	„ ...	78	1	4½	30·81	24·35

TABLE II.—NUMBER OF CATTLE OF THE VARIOUS BREEDS TESTED SINCE 1895, WITH THEIR AVERAGE PERIOD OF LACTATION, WEIGHT OF BUTTER, BUTTER RATIOS, AND POINTS—*Continued.*

Year	No.	Breed	Average No. of Days in Milk	Average Weight of Butter		Average Butter Ratio	Average No. of Points
				lbs.	ozs.	lbs.	
From 1896 to 1900	8	Ayrshires ...	52	1	13¼	26·35	—
1901	1	,, ...	125	1	7½	27·65	32·10
1902	1	,, ...	33	1	3½	18·00	19·50
1903	0	,, ...	—		—	—	—
1904	1	,, ...	116	0	12½	35·20	20·10
1905	3	,, ...	77	1	2½	28·07	22·88
1906	2	,, ...	23	1	11¾	25·51	27·70
1907	—	,, ...	—		—	—	—
1908	4	,, ...	75	1	2	35·19	21·00
1909	—	,, ...	—		—	—	—
1910	1	,, ...	88	1	15	25·93	35·80
1909	4	South Devons	105	1	13¾	24·77	33·66
1910	7	,, ...	91	1	11½	29·33	32·87
,, 1896 to 1900	3	Dexters and Kerries	117	0	14¾	40·80	—
1901	1	,, ...	83	1	6¼	21·17	26·55
1902	2	,, ...	46	1	7⅜	21·28	23·49
1903	—	,, ...	—		—	—	—
1904	2	,, ...	72	0	14¾	21·31	18·45
1905	1	,, ...	149	1	1¼	23·47	28·15
1906	2	,, ...	33	1	13	22·40	29·10
1907	2	,, ...	65	1	11¼	21·06	29·70
1908	5	,, ...	124	1	6	24·47	29·13
1909	2	Kerries ...	75	1	6	20·86	25·65

Table III.—Average Yield of Butter of the Different Breeds at Different Periods.

Year	Breed	No. of Cows	Days in Milk, 50	No. of Cows	Days in Milk, 100	No. of Cows	Days in Milk, 135	No. of Cows	Days in Milk, 190
			lbs. ozs.		lbs. ozs.		lbs. ozs.		lbs. ozs.
1895 to 1900	Shorthorns	19	1 12½	6	1 7½	2	1 4⅜	8	1 1½
1901	,,	2	1 8	—	—	1	2 6	—	—
1902	,,	6	1 10½	—	—	1	1 11	—	—
1903	,,	3	1 7	—	—	1	1 6¼	—	—
1904	,,	3	1 10⅓	1	1 14½	—	—	—	—
1905	,,	2	1 1	1	2 0½	2	1 7¾	—	—
1906	,,	11	1 8½	3	1 3½	—	—	—	—
1907	,,	11	1 9⅓	2	1 9¾	1	0 15¾	—	—
1908	,,	11	1 11¾	—	—	2	1 12	—	—
1909	,,	11	2 0½	5	1 11½	3	1 8½	—	—
1910	,,	16	1 14¼	5	2 1	1	1 3¼	—	—
1907	Lincoln Reds	3	1 12	1	1 11	—	—	—	—
1909	,,	6	2 1	1	1 9¾	1	1 7	—	—
1910	,,	4	1 10½	—	—	3	1 10½	1	1 13½
1895 to 1900	Jerseys	23	1 10¼	15	1 8½	11	1 8⅙	31	1 10½
1901	,,	1	1 12	8	1 7¾	6	1 9	12	1 10½
1902	,,	4	1 9 3/16	3	1 8⅔	2	1 14	9	1 11
1903	,,	4	1 9⅛	5	1 15	9	1 9⅔	2	1 9¾
1904	,,	2	1 10⅛	3	2 2⅓	4	2 0 1/16	1	1 13½
1905	,,	3	1 8½	4	1 15½	8	1 9¼	2	1 8½
1906	,,	5	1 10¾	3	1 3¾	4	1 15¾	1	1 5½
1907	,,	6	1 13⅕	2	1 7⅞	3	1 13	1	1 4¾
1908	,,	4	1 14½	3	1 10	4	1 1	2	1 2
1909	,,	3	1 3	4	2 2½	6	1 14¾	9	1 12
1910	,,	2	1 10½	5	1 13½	2	1 15½	7	1 13½
1895 to 1900	Guernseys	3	1 7⅓	4	1 7½	3	1 4⅝	1	1 8
1901	,,	1	1 15¼	2	1 5¾	—	—	2	1 8⅝
1902	,,	—	—	—	—	—	—	—	—
1903	,,	2	0 15¼	—	—	—	—	—	—
1904	,,	2	1 6¾	—	—	1	2 0½	—	—
1905	,,	1	1 10½	—	—	1	1 12¼	1	0 13½
1906	,,	—	—	1	1 1	1	1 5½	—	—
1907	,,	—	—	—	—	—	—	1	1 14
1908	,,	1	1 13	—	—	—	—	1	1 14
1909	,,	1	1 11	1	1 8¼	—	—	—	—
1910	,,	1	1 3½	1	1 3¾	—	—	—	—

TABLE III.—AVERAGE YIELD OF BUTTER OF THE DIFFERENT BREEDS AT DIFFERENT PERIODS—*Continued.*

Year	Breed	No. of Cows	Days in Milk, 50	No. of Cows	Days in Milk, 100	No. of Cows	Days in Milk, 135	No. of Cows	Days in Milk, 190
			lbs. ozs.		lbs. ozs.		lbs. ozs.		lbs. ozs.
1895 to 1900	Red Polls	10	1 4½	2	1 8	2	0 12¾	1	0 11
1901	”	—	—	2	1 8⅝	—	—	1	—
1902	”	—	—	3	1 8	—	—	—	1 2¼
1903	”	1	0 13¾	1	1 1¼	—	—	1	0 13
1904	”	1	1 13	2	1 1	1	1 7¼	—	—
1905	”	3	1 1	2	1 5	—	—	1	0 12
1906	”	7	1 0	—	—	2	0 14¼	—	—
1907	”	5	1 4	—	—	4	1 1¼	—	—
1908	”	1	1 2¾	—	—	—	—	1	1 1
1909	”	1	1 12	1	1 2¾	1	1 6¼	1	0 12½
1910	”	2	1 3¼	1	1 9¼	—	—	1	1 2¼
1908	Ayrshires	—	—	—	—	—	—	1	0 12
1909	”	—	—	—	—	—	—	—	—
1910	”	—	—	1	1 15	—	—	—	—
1909	South Devons	1	2 5¾	1	1 1¾	—	—	2	1 11½
1910	”	1	2 5¼	4	1 11½	1	2 0	1	0 12¾
1908	Kerries & Dexters	—	—	—	—	1	0 14	2	1 2
1909	”	1	1 5	—	—	1	1 7	—	—
1910	”	—	—	—	—	—	—	—	—

Table IV.—Comparisons of Churnings with Analyses.

No. in Catalogue	Weight of Butter Churned		Total Fat shown by Chemical Analyses		No. in Catalogue	Weight of Butter Churned		Total Fat shown by Chemical Analyses	
	lbs.	ozs.	lbs.	ozs.		lbs.	ozs.	lbs.	ozs.
Shorthorns.									
1	1	10½	1	14	57	1	6¾	1	13
2	1	6½	1	14	58	2	3¼	2	1½
5	2	3¼	2	5	59	2	2½	2	6
12	2	10¼	2	13	60	2	1½	2	0¼
13	2	14½	2	15	61	2	0½	2	8½
21	1	7¾	1	7¼	62	1	15¼	1	14
23	1	1¾	1	10½	65	1	13¼	2	1
52	2	2¾	2	3	69	1	15¾	2	1¼
53	1	3¼	1	2½	70	1	9¼	1	10¼
54	1	5½	1	8	72	1	7½	1	9
55	2	5¼	2	7	74	2	7¼	2	8
						41	10	44	12
Lincolnshire Red Shorthorns.									
91	1	3	1	6½	95	1	14	1	13
92	1	12	2	1	96	1	12¼	1	14
93	1	10¾	1	6	97	2	0¼	1	15
94	1	13½	1	14¾	98	1	4¼	1	4
						13	6	13	10¼
Jerseys.									
109	1	9½	1	8½	127	1	15¼	1	13½
112	2	5½	2	4	128	2	4½	2	5½
117	2	1	2	0	129	1	13¾	2	2
118	2	0	1	15	130	1	7½	1	11½
119	1	15¼	1	13	133	2	2	2	6
121	2	1¾	1	15	135	1	15½	1	11¼
122	1	11¼	1	10½	136	1	7½	1	10½
125	1	4¾	1	3	142	1	6	—	
126	2	3	2	1¾	146	1	8¾	—	
						33	4¾*	30	3*
Guernseys.									
174	1	3¾	1	3½	177	1	3½	1	10
						2	7¼	2	13½
Red Polls.									
179	1	6½	1	14¾	183	1	9¼	1	10½
180	1	2¼	1	7	188	1	0	1	3¾
						5	2	6	4
Ayrshires.									
194	1	15	1	12	—	—		—	
						1	15	1	12
South Devons.									
197	0	12¾	0	14¾	202	1	13¾	2	3
198	1	12	1	13	203	2	5¼	2	5
199	1	6	1	11¾	205	1	14¾	2	3
200	2	0	1	15					
						12	0½	13	1½

* If Nos. 142 and 146—the milk of which was not analysed for fat contents—be eliminated, the figures are: 30 lbs. 6 ozs. and 30 lbs. 3 ozs.

TABLE V.—AVERAGE DIFFERENCES BETWEEN CHURNINGS AND CHEMICAL ANALYSES FROM 1898 TO 1910 INCLUSIVE.

Year	Breed	Churn	Analyses
		Lbs. Butter	Lbs. Fat
1898	Shorthorns	38·92	36·82
1899	"	34·34	32·46
1900	"	35·55	37·87
1901	"	29·05	27·80
1902	"	53·48	55·91
1903	"	30·72	35·92
1904	"	22·98	26·59
1905	"	30·89	30·58
1906	"	31·38	33·59
1907	"	45·14	47·79
1908	"	43·74	49·78
1909	"	35·06	35·91
1910	"	41·62	44·75
1907	Lincolnshire Red Shorthorns ...	12·94	12·31
1908	" " "	15·79	15·56
1909	" " "	14·06	13·48
1910	" " "	13·37	13·62
1898	Jerseys	29·15	27·26
1899	"	23·61	22·54
1900	"	39·75	39·32
1901	"	33·19	31·82
1902	"	43·61	41·03
1903	"	27·04	26·41
1904	"	22·22	22·06
1905	"	24·53	22·44
1906	"	19·56	18·71
1907	"	22·64	—
1908	"	22·25	—
1909	"	37·65	35·89
1910	"	*30·37	30·18
1898	Guernseys	8·07	8·25
1899	"	5·90	5·53
1900	"	10·84	11·10
1901	"	12·46	11·59
1902	"	1·23	1·34
1903	"	5·34	6·47
1904	"	4·89	4·94
1905	"	3·42	3·42
1906	"	2·41	1·82
1907	"	3·54	3·22
1908	"	3·69	3·52
1909	"	3·20	3·52
1910	"	2·44	2·81

* Excluding Nos. 142 and 146.

TABLE V.—AVERAGE DIFFERENCES BETWEEN CHURNINGS AND CHEMICAL ANALYSES FROM 1898 TO 1910 INCLUSIVE—*Continued.*

Year	Breed	Churn	Analyses
		Lbs. Butter	Lbs. Fat
1898	Red Polls	5·04	5·56
1899	„	8·48	8·33
1900	„	8·98	9·81
1901	„	3·07	2·88
1902	„	8·36	8·00
1903	„	5·01	6·95
1904	„	5·39	6·00
1905	„	13·42	14·53
1906	„	11·39	14·50
1907	„	12·53	16·08
1908	„	3·21	4·06
1909	„	5·09	5·71
1910	„	5·12	6·25
1910	Ayrshires	1·94	1·75
1909	South Devons	6·89	7·03
1910	„	12·03	13·06
1907	Kerries	3·40	3·19
1908	Kerries and Dexters	6·89	7·09
1909	Kerries	2·75	2·64

THE POULTRY SECTION.

By L. C. Verrey.

It is gratifying to be able to report that this Section of the Dairy Show of 1910 ranks amongst the best of its 34 predecessors, the quality of the exhibits being higher, whilst the total number exceeded last year's by no less than 262 entries, the result being 3,259. As each Show comes round, the public appear to take keener interest in poultry culture, and consequently the attendance of visitors increases, a fact that is clearly demonstrated by the congested state of the galleries. This was especially noticeable on the second and third days of the show, when locomotion between the rows of pens was exceedingly difficult, whilst the atmosphere was particularly close and hot. The light on the Tuesday morning was excellent during the time the judges were at work, a fact that materially facilitated their arduous duties.

It is a matter of satisfaction that the Table Poultry had a considerably increased entry over previous years, the quality superseding that of many former displays, both these facts being most pleasing and encouraging for further efforts to be made to still further develop this particular branch of the Show, there being no reason why the display of dead poultry at the Dairy Show should not be the largest and best in the United Kingdom. The judge (Mr. Leeson) in his report says that it was a very good display, and to his mind one of the best he ever saw. He further suggests that it would be a great advantage if the correct weights were put on the class number tickets of each exhibit There is no doubt that such a method would certainly add to the interest of the display, as the public would then have the opportunity of seeing at a glance the exact weight of each separate exhibit. The first class was for a couple of pure-bred Dorking cockerels, but contained only 6 entries. The first prize pair being of very fine quality, but they were beaten for the Medal by an exceptionally fine brace of pullets. The classes for Sussex filled well, but were eclipsed by those for couples of Any Other Variety, in which Buff Orpingtons predominated, for out of the 20 couples of cockerels no less than 13 were of this popular variety of fowls The majority of the pullets were also of this breed The Cross breeds presented a splendid display, and it was amongst these that was found the *pièce de resistance* of the whole collection, inasmuch as that the champion prize, the Gold Medal offered by the Worshipful Company of Poulterers, was awarded to a truly magnificent pair of Indian Game-Buff Orpington cockerels weighing 21 lbs 10 ozs ; a couple of pullets of the same cross gaining the Silver Medal The "Special" classes for unfatted birds again brought large entries, there being 28 pairs of cockerels and 26 of pullets. The Waterfowl were not nearly so numerous as could be desired, but the quality of the Ducks

was very good indeed, the first and Medal winning pair of Aylesburys being of exceptional size and merit. Goslings were just fair average birds.

The Live Poultry commenced with the Breeding pens, which always prove most interesting and instructive, and the Berner's Hall, in which they were located was thronged with visitors the whole time the Show was open. Crowds of visitors were always to be found around the pen containing the splendid quartette of Buff Cochins, which took premier honours in the class for Feather-legged Breeds, and also round the pen of wonderfully fine Partridge Wyandottes, which secured the Silver Medal for the best of all the breeding pens.

The third class, viz., that for Any Other Clean-legged Variety, contained a varied collection of splendid fowls, of which a tip-top quartette of Brown Red Modern Game secured premier honours, Silver Pencilled Hamburgs coming second, and a fine lot of Crève-Cœurs third.

The Dorkings were not nearly so numerous as on previous occasions, in fact, there were only 33 exhibits in the 4 classes; this may be to some extent due to the unfavourable spring and summer, but I fear that there are signs that this good old English breed fails to captivate the modern fancier, and consequently its cultivation is pursued by a comparatively few breeders who still recognise its sterling worth. The Medal for the best Dorking was awarded to a magnificent coloured pullet of great size.

Langshans again showed a slight falling off in numbers, though the quality is more than maintained. Again, the Silver Medal went to a very typical pullet with excellent sheen. There were only six Blue Langshans competing, a fact which seems to point to the conclusion that this variety does not catch on with poultry breeders. On the other hand, Croad Langshans mustered in great strength, there being 41 entries in the two classes, or 4 more than in the combined classes of Modern Blues and Blacks.

Brahmas were again disappointing in numbers, and the class for Dark cockerels was cancelled owing to insufficient entries. A well-feathered light pullet secured the Medal for the best Brahma.

Cochins, that were once so popular, and may be justly said to have held pride of place among all the various breeds of poultry, have sadly fallen from their once exalted position, for not only had the class for Buff cockerels to be cancelled, but the three remaining classes only mustered 23 birds between them.

Minorcas, on the contrary, well maintained their reputation, and made a very fine collection of 23 cockerels and 32 pullets. The Medal was awarded to an exceptionally fine upstanding cockerel with grand head points.

Houdans and Faverolles were certainly very good, the latter being especially numerous, and all made a very interesting display.

Malines, for the first time at the Dairy Show, had a separate classification, and a very creditable lot they were. It would seem as though the breed had come to stay in England.

Hamburgs and Modern Game were represented by moderately filled classes of high quality specimens.

Old English Game made a capital display of 91 entries in the 7 classes, the Medal being gained by a very typical Brown Red pullet. Black Sumatra Game seem to make very little headway indeed in public favour. Malays were about on an average of former years whilst Indian Game were well in advance, the pullets being particularly strong in numbers.

Andalusians appear to be quite at a standstill as regards popularity, and it is to be feared that unless strenuous efforts are made by their partisans, the day will not be far distant when the "Blues" will cease to find a place to themselves in the catalogue.

Leghorns made a highly satisfactory collection of 159 exhibits, the quality all through being of the best. The Silver Medal for the best Leghorn was awarded to a large pure-coloured White cockerel with magnificent head points. The Whites certainly show a very marked improvement in all points to the specimens exhibited a few years ago, the reversion to type being particularly noticeable.

Barred Plymouth Rocks formed two very nice classes of 27 cockerels and 25 pullets, but this breed seems to be slowly losing favour as these numbers do not compare favourably with those of years ago, for on referring to the catalogue of 1892, it will be seen that in that year there were 42 cockerels and 55 pullets exhibited. Is it that the exclusive breeding for feather has spoilt its usefulness, or is it that this once sterling, good all-round breed is being supplanted by the more modern introductions in poultry culture? Whichever reason it may be, one can but regret that such a beautiful and useful variety should apparently be on the wane. Amongst the pullets was found the recipient of the Champion Cup for the best pullet in the whole Show. The winner of this most distinguished honour was indeed worthy of it, for seldom has there been seen a bird of such magnificent colour and evenness of barring. The Buffs and the Whites made four very creditable classes, but the Blacks seem to hang fire sadly, judging by the few specimens exhibited.

Wyandottes formed the strongest section of any breed at the Dairy Show, the total being 359 entries, the Whites alone contributing 58 cockerels and 60 pullets to this result. The first prize Silver-Laced cockerel secured the Silver Medal for the best Wyandotte and also the Champion Cup for the best cockerel in the Show. The Black variety came next as to numbers, all the other varieties making good average classes, excepting in the case of the Silver-Pencilled cockerels, where the competition was very limited.

Orpingtons, which for some years clearly had the lead as regards the number of entries for any one breed, had their record lowered this time, the Wyandottes exceeding them by 49 pens. Still, a collection of 310 specimens was by no means discreditable, this total being made up of 104 Buffs, 91 Whites, 72 Blacks and 43 Any Other Colour. A very even-coloured pullet secured the Association's Silver Medal for the best Buff Orpington of either sex.

The Sussex fowls seem to be making headway in public favour, for the classes provided for them were well filled with birds of excellent quality.

The two classes for Any Other Distinct Variety contained a most varied assortment of breeds, including Rhode Island Reds, Polish, Scots Greys, Blue Plymouth Rocks, Blue Orpingtons, Red Caps and two specimens catalogued as "Bosnians."

The Selling classes were a strong feature, there being no less than 499 entries, many of the exhibits being of extra merit, so much so, that the first prize Dorking cockerel, entered at the £2 limit, made £11 10s. at the auction; whilst several other specimens fetched considerably over catalogue price.

The Bantam room, as usual, was a source of great attraction to visitors, the pigmies always calling forth exclamations of admiration and wonderment. The Modern Game Bantams were excellent, a very smart hard-feathered little Black Red winning the Silver Medal. The Old English were very good indeed, as were also the Malays, all being perfect miniatures of the larger breeds. The numerous different varieties of Bantams (not Game) made a large and charming collection. Undoubtedly the Black Rosecombs were the best staged for some years, the Medal for the best Bantam (not Game) being awarded to a very pretty little cock of this variety. Special mention may be called to the Sebrights, the Silvers especially being of excellent merit.

Turning to the Waterfowl, the quality throughout was very high, and all the classes filled well, the Indian Runners and Buff Orpington Ducks being a particularly numerous and meritorious lot.

Geese were exceptionally good, a very massive three-year-old Toulouse securing the Silver Medal and also Cup for the best Waterfowl in the Show.

Turkeys were quite up to the average for numbers and merit, the Whites, however, having the smallest classes.

In conclusion, I think that all concerned have cause for satisfaction at the result of the Dairy Show of 1910.

THE PIGEON SECTION.

By John H. Ross.

In writing a few notes on the Pigeon Section at the Dairy Show of 1910, I cannot refrain from recording my satisfaction at the continued support we receive from the exhibitors of pigeons. Although the entry fee is considered high by some, I would point out that this is the only show at the present time in the United Kingdom offering money prizes of £2, £1 and 10s in each class, and I should be very sorry to see them reduced with a smaller entry fee. The entry of 2,303 showed a slight increase over 1909. The judging was finished in good time and all the award cards were up by 2.30 p.m. on the Tuesday. The day was bright and sunny, and this, no doubt, assisted the judges in their awards, so very different to the dull and foggy days that we have occasionally experienced at this event.

Fantails, as usual, were the first in the catalogue, and mustered 72 in 8 classes, against 59 last year. The quality all round was good, but many of the Blacks were in moult and difficult to appraise at their right value. A better collection of Blues has rarely been seen at the Agricultural Hall, and the winner (pen 3298, G. E. Gray) secured the Silver Medal of the Association for the best Fantail bred in 1910, a bird excelling in body shape, tail and action. The Saddles were also good in Fantail properties and also colour markings.

Pouters were a disappointment, the two Adult classes being cancelled for want of support. The young ones, 10 cocks and 7 hens, were of average merit, Blues winning the leading card in each class.

Pigmy Pouters (63) had an increase of 9, and it is highly satisfactory to see the numbers so well maintained. The largest classes being the Any Other Colour, young birds, viz., 14 cocks and 13 hens. The old birds were, as usual, of a very high standard, although the majority of them were scarcely over the moult. The judge was disappointed in the quality of the youngsters, and with the exception of very few, there was nothing of any moment. The Reds and Yellows are improving very fast, and the Association Medal for the best Pouter or Pigmy bred in 1910 was awarded to a good-coloured Red hen (pen 3405, F. W. Waterman).

Norwich Croppers totalled 25 in 3 classes, which was somewhat disappointing as there were 28 in 2 classes last year. Although the numbers were small, the quality of the exhibits was above the average. The prizewinners all had marvellous crops.

Carriers with one class less than last year brought together 68 birds, an addition of one. The judge reports that the exhibits were above the average and showed a decided improvement in quality, style and condition. The Adult hens were the best seen for some time and the Yearling classes both contained extra good birds In young birds, the winning Black cock (pen 3460, G. & J. Smith) was exceptionally good and also won the Carrier Club Cup and the Association's Medal for the best young Carrier. Mention should be made

of the young Dun hens, also the Whites, as being especially promising.

Barbs (35 in 4 classes) were a grand lot, particularly the Yearling and Young classes. The Firth Challenge Trophy for Yearlings was won outright by W. H. Edwards with pen 3498, a Red as near perfection as possible. The colour in Barbs has been sadly neglected the last few years, and breeders should take serious notice of this point.

Dragoons maintained their numbers, but I was sorry to see such poor classes of Adults and Yearlings, the former being 57 in 9 classes, and the latter 70 in 8. The majority of the best birds living of each colour were on view, and the winning Adult Blue cock (pen 3528, Dr. C. H. Tattersall) had the honour of securing the Gold Medal of the Association for the best pigeon in the show. The interesting Yearling classes contained many promising specimens, and the winners, in most instances, were birds that had made history in 1909. The collection of 183 Young Birds in 14 classes was good and contained many fine representations of the breed. Blues were not up to the standard of a few years ago, but the Chequers were splendid in quality and provided the winner of the Cotton Challenge Cup for hens (pen 3774, W. Hunter Johnston). The winner in the Silver cock class (pen 3690, Dr. C. H. Tattersall) is a lovely specimen and had already won his spurs at a previous event. Grizzles are increasing in popularity, and the Cotton Challenge Cup for cocks went to pen 3705, J. S. Procter, for one of the best of this colour seen for some time. Yellows were the two largest classes in this variety, viz., 19 cocks and 21 hens, and were remarkable in that all the prizewinners in both classes were all bred by one exhibitor—W. Bastard. The second prize winner in the cock class was claimed at the Auction Sale for £40, which I think constitutes a record for the colour. Classes for Reds were scheduled for the first time at this show and were most interesting and promised well for the future. A few specimens of the new colour Mealy appeared in competition with the Blues, and are also evidently making good progress.

Shortfaced Tumblers were one of the finest collections seen at the Dairy Show—81 in 6 classes. The Self Red (pen 3849, W. B. Pickard), winner of first prize in the Any Other Variety cock class, is a grand little bird, excelling in carriage. The three Young classes were hotly contested, Almonds leading with 19 entries, but the Association Medal went to the winner in the Any Other Variety hen class (pen 3911, A. G. Bevan), a charming little Yellow with first-rate Tumbler properties.

Longfaced Tumblers were a grand collection of 244 pens, and it was hard to find a bird that was not good and well shown in the Adult classes. The pick of the young birds were the Beards and Mottles or Rosewings, making special mention of the well-marked Yellow Rosewing (pen 4117, H. S. Nicholson), and the Black Mottle (pen 4122, R. Smith), a very beautiful bird, which also won the Association Medal for the best Longfaced Tumbler bred in 1910. The class for Muffed Legged birds was the largest we have ever had and contained many birds

worthy of a first prize, and, in the opinion of the judge, was the best quality class in all the Longfaced Tumblers.

English Owls were not very strong in numbers—52 in 7 classes—but most of the cracks of the variety were present and refought their battles. The best-filled classes were the young Silvers (10), a very good class, and the Any Other Colour (11), the winner being a Dun of good stamp (pen 4208, Ward & Clegg).

Foreign Owls mustered 42 in 4 classes, and the judge had a hard task to separate the winners, all colours competing together in the Adult classes, which contained many notable champions. The young White (pen 4235, W. A. Skerrett) in addition to winning first in its class, also took the Association Medal for the best English or Foreign Owl and the Champion Cup for the best pigeon in the show bred in 1910.

Turbits had 84 entries, and the classes generally were below the form and quality of previous years, partly owing to the inclement season and also to the fact that two large shows of Turbits had taken place a short time previously. The Any Other Colour classes contained the best birds in quality. The Association Medal winner (pen 4326, J. J. Tolman) was an especially good Black, and the young Silver hen (pen 4315, H. P. Scatliff) deserved all she got. I regret the young Red and Yellow classes were cancelled for want of support.

Archangels—48 in 4 classes—were well above the average in quality and, taken altogether, were as good as have been seen at the Dairy Show. Condition is everything in this variety, as plumage is chief point and told in favour of the winners The two Young classes of 18 cocks and 14 hens were keenly contested, the young cock (pen 4360, R. C. Hall) winning the Archangel Club Medal for the best youngster.

Jacobins are another variety that has suffered from the inclement moulting season, and the entries were not quite so numerous as last year, but with 64 in the 5 classes made a good display. The winner of the Association Medal (pen 4415, J. Grundy) was a grand-feathered Red, and also won the Esquilant Challenge Trophy offered this year for the best young Fantail or Jacobin. The judge again suggests that the young Red or Yellow class should be divided, providing a separate class for each colour.

Runts were a good class of 11, of fair average merit.

Nuns with 4 classes, one of which was cancelled, brought together a good lot of 31 birds.

Oriental Frills had a capital entry of 133 in 14 classes, an increase of 13 pens with 2 classes less than in 1909. The beautiful and varied plumage of these birds is always an attraction, and in all varieties the champions were on view. The young classes, as usual, were the best supported, notably the Satinettes, 18; and the Bluette and Silverette class was also a good one of 13. The Fulton Challenge Trophy was won by a very beautiful Black-laced Blondinette (pen 4541, J. F. King); the same exhibitor winning the other two prizes and reserve in the class.

Magpies are always a good collection at the Dairy Show, and this year was no exception with 138 entries. The Association Medal for

the best Magpie went to F. Warner's Black (pen 4628), a very typical bird, and a noted winner in 1909 The Yellows were very good classes of 14 cocks and 15 hens The Blues and Silvers, although smaller in numbers than the other colours, show gradual improvement, the winning Silver cock (pen 4722, W. R McCreath) excelling in skull properties for one of that colour.

Scanderoons were not as good as they should have been either in quality or quantity, but the first prizewinners, which were both Reds, stood away from the rest.

Swallows, Fairy Swallows and German Toys were small but interesting classes; a grand Fairy (pen 4787, J. McIntosh) winning in the former, and in the latter a Yellow Snipe of wonderful colour (pen 4794, A. A. Gatty).

I am pleased to note the revival of interest in Antwerps, as the following figures show: in 1908, 33 entries; 1909, 45 entries; and this year 52. The judge states that the Adults are showing more quality and type. The improvement in young birds was very pleasing. The Medal winning young hen (pen 4828, I Greenwood) carried not only type, but a grand beak and heavy skull.

Show Homers, as usual, had a huge entry of 197 in the open and 75 in the limit classes. In common with other varieties they appeared backward in the moult. The Red Chequer cock shown by J. S. Pickles (pen 4879) won for the second time the United Show Homer Club's Trophy for the best Show Homer of any age. The Young Bird classes were keenly contested, and the selection of the winners must have given the judge a lot of trouble, especially in the Blue or Black Chequer classes of 25 cocks and 28 hens. The Association Medal for the best young one went to the Blue Chequer cock (pen 4937, N. Jones).

Cumulets were disappointing as regards the number of exhibits, the numbers being 32 in the 4 Open classes and 12 in the Selling class. The judge reports that the quality was fully maintained.

The entry in the Working Homer classes of 126 was slightly in excess of last year. The quality and condition of the exhibits were in every way most satisfactory, and would compare favourably with past or any other shows in the country. The Cup for the best bird bred in 1910 and flown at least 100 miles was won by Dr. W. E. Barker with a smart Blue Chequer (pen 5109), and looked every inch a worker.

Exhibition Flying Homers with a slightly increased classification brought together 86 birds and were considered a fine show. The Exhibition Flying Homer Society's Gold Medal for the best bird was won by a lovely Red Chequer hen (pen 5208, Miles Benson), and the Silver Medal of the Association for the best bird bred in 1910 fell to a Blue Chequer hen of good type and carriage (pen 5278, L P. Brown). The 1910 birds showed improvement, especially the Blue Chequers.

The Any Other Variety class was a very interesting one of 17 pens, a grand Black Trumpeter winning first (pen 5291, W. Smith), followed by a pretty Modena and a rare Swift.

The Selling classes were well filled, and contained a good lot of cheap birds of better quality than previous years, and many found new owners.

APPLICATIONS FOR PATENTS FOR DAIRY APPLIANCES, &c.

From January 1st to December 31st, 1910.

No. of Application.	Name of Applicant.	Subject of Invention.
31	Robertson, A. R.	Cream separators.
348	Jonsson, G. E.	Milking machine.
665	Steel, L. R.	Milk cans.
666	Steel, L. R.	Glass-lined milk cans.
724	Reed, T.	Butter merger.
805	Robertson, A. R.	Cream separators.
1,064	Bond, F. T.	Adaptation of cheese for dietetic purposes.
1,679	Sabroe, T. J.	Pulsators for pneumatic milking.
1,743	Witte, A.	Process for making butter.
2,027	Lebreil, F., and another	Rendering casein plastic.
2,296	Johansson, F. J., and another	Milking machines.
2,505	Hearson, T. A.	Milking machines.
2,933	Flory, T. W.	Mixing, &c., apparatus in churning, &c.
3,390	Frost, A. E., and Dairy Outfit Co., Ltd.	Souring or curdling milk.
3,508	Müller, P.	Reducing the proportion of salts and sugar in milk without affecting the normal content of fat and casein.
3,613	Wendler, O.	Processes for determining fat in milk, &c.
4,266	Jarrett, G.	Cream containers for dairy use.
4,301	Edwards, T.	Cream separators.
4,664	Jones, E.	Preparation of soured milk.
4,746	Parker, S. C. T.	Milk cans.
4,961	Max Goehler	Milk separator.
5,514	Webb, R. H.	Cans for the delivery of milk.
5,525	Lawrence, W. H., and Kennedy, R.	Teat cups for milking machines.
6,271	Wood, R.	Forming butter into rolls or the like.
7,451	Sundberg, E.	Milking machines.
8,050	Ewing, M.	Controlling the temperature of milk and cream.
8,788	Wells, E.	Butter worker.
10,321	Portway, H.	Cutting or dividing butter.
10,690	Davies, J. H., and Ransome	Teat cups for milking machines.
10,833	Jonsson, G. E.	Milking machine.
11,452	Nielsen, J.	Milking machine.
11,916	Henrichsen, J., and another	Milking appliance.
12,285	Roy, W. J.	Milking apparatus.
13,865	Springborn, E.	Chemical combination for treatment of milk.
16,832	Johansson, F. J.	Milking machine.
17,239	Davies, J. H., and Ransome, E. L.	Pulsators for milking machines.
17,270	Hocknell, A. S.	Cheese vats.
17,526	Bryan, S., and Pennington, J. A.	Apparatus for retailing milk.
17,673	McLarty, F. M.	Churning, separating, and testing milk.

APPLICATIONS FOR PATENTS FOR DAIRY APPLIANCES, &c.

From January 1st to December 31st, 1910.

No. of Application.	Name of Applicant.	Subject of Invention.
18,289	Llewellyn, G. H.	Combination churn and butter worker.
18,464	Levin, H.	Delivering milk to customer.
19,704	Story, L. L.	Mechanical milkers.
20,341	Newton, W. B.	Process for producing clotted cream.
20,642	Ede, Hall, & Churchyard	Stirring, &c., device for domestic manufacture of a modified butter or butter substitute.
21,561	Moses, G.	Cheese and butter cutter.
22,797	Rony, P. M. C.	Manufacture and preservation of cheese.
23,170	Loqvist, A. H.	Milking machines.
23,676	Birney, J. L.	Treatment of milk.
24,162	Mollinger, T. G.	Preservative treatment of milk.
24,171	Sharples, D. T.	Method of milking.
25,081	Lindström, K. T.	Milking machines.
25,406	Jones, W., and others	Delivery and receiving of milk.
26,264	Faitelowitz, A.	Testing the freshness of milk.
28,502	Westberg, K. R.	Milking machines.
29,337	Henrichsen, C. V.	Pulsators for pneumatic milking.
30,005	Gillies, A.	Teat cups.
30,121	Barham, A. S.	Apparatus for delivering milk.

ANNUAL REPORT OF THE CONSULTING CHEMIST.

Mr. F. J. Lloyd, F.C.S., F.I.C.

During the year 1910 I received 221 samples for analysis from members of the Association. While this is a considerable increase upon the number received in the preceding year, it is still so small as to indicate that members of the Association do not fully realise the chemical privileges which they possess

In connection with the Dairy Show 250 samples were analysed, so that the total number for the year was 471.

The majority of the samples sent by members were milk. In many cases these were sour, being sealed duplicate samples which had been taken by an inspector under the Food and Drugs Act and retained until the result of the analysis of the public analyst was known. I would point out that this is a great mistake. In the first place, the cost of the analysis is double what it would be if the sample reached me fresh, while the results are never so reliable as those obtained with a fresh sample. But the most important fact is that should the milk turn out to be wrong it is too late to discover the cause, too late to test the milk given by the cows to determine whether it contains the constituents which should be present, if these are not present to discover and remedy the cause, and if they are present then to discover why the sample taken by the inspector was wrong.

Dairy farmers who complain of the hardship of the prosecutions for selling milk below the limits might with advantage take a little more trouble to know regularly what quality of milk their cows are yielding, and not wait until a sample is taken by an inspector, and often then do nothing until it is too late for the analysis to be of much use.

Twenty samples of cream were sent me during the year, mostly to determine the percentage of boric acid present.

Nine samples of butter were sent, mostly for the estimation of water.

Two feeding stuffs, three manures, three dried milks, and two soils make up the remainder of the samples.

What can be said of a society of dairy farmers numbering nearly 1,000 members who only require two samples of feeding stuffs and three samples of manures analysed in a twelvemonth? It seems to me evident that the farmers of the present day have no adequate conception of the value of accurate knowledge in their industry. They do not seem to realise that the soil is like their bank, out of which you cannot draw what it does not contain. What would a banker do if a bag was handed him said to contain so much gold and silver, to be put to your credit? He would at once see if the gold and silver were there. So the farmer who purchases manure for his soil supposes he is putting substances there which the plant may subsequently draw upon.

But it is evident that dairy farmers empty the bags and take it for granted the substances are there. Unlike the banker, they do not trouble to prove it. They lose their money, they lose their anticipated crop, they lose the profit which should come of good farming, simply because they are blind to the value of that accurate information which chemical analysis could provide them with. The same is true in the purchase and use of feeding stuffs. Money is spent on inferior material. The animals do not get the nutriment they require, the milk they yield is neither in quantity nor in quality what it should be. Then if it is sold the evil day comes when the inspector takes a sample, and prosecution and worry and disgrace follow. More money is spent then to try and save the situation than would have sufficed to keep the farmer for years supplied with a scientific and accurate knowledge of the materials he purchased and of those he produced.

I sometimes ask myself what is the use of all the agricultural colleges and the large sums of money spent on agricultural education if the farmers are not taught to realise the truth that in the successful utilisation of Nature and Nature's laws only knowledge and facts count.

EXAMINATIONS FOR CERTIFICATES AND DIPLOMAS.

The Association grants to any Candidate, male or female, who satisfactorily passes the necessary Examinations :—

(A) A **Certificate of Merit for Proficiency in the Theory and Practice of Butter-making.** Entry Fee, 5s.

(B) A **Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making.** Entry Fee, 5s.

(C) A **Teacher's Certificate for Proficiency in the Science and Practice of Dairying.** Entry Fee, 10s.

(D) A **Diploma and Silver Medal for Proficiency in the Science and Practice of Dairying and Dairy Farming.** Entry Fee, 10s.

The Examinations, which will extend over two or more days, will test (firstly) the Theoretical Knowledge of the Candidates, (secondly) their Practical Skill in Butter-making or Cheese-making, or both. Each Competitor will be required to answer, in writing, a set of questions within a given time, and will also be examined *viva voce*. The Practical Examinations will take place on the same or on the following day, at a suitable Dairy.

Candidates for the Butter-making Certificates must produce satisfactory evidence that they have received at least three months' instruction (not necessarily at a Dairy School) in the Theory and Practice of Butter-making. They must possess an elementary knowledge of Chemistry and Bacteriology so far as they relate to the use of Milk, Cream, and Butter and a fair knowledge of Sections 1, 2, 3, and 5 of the following syllabus. They will be required to make Butter.

Candidates for the Cheese-making Certificate must produce satisfactory evidence that they have received at least six months' instruction (not necessarily at a Dairy School) in the Theory and Practice of Cheese-making. They must possess an elementary knowledge of Chemistry and Bacteriology so far as they relate to Milk and Cheese, and also a fair knowledge of Sections 1, 4, and 5 of the following syllabus. They must have full knowledge of the production of one variety of Hard Cheese, also a general knowledge of the manufacture of other varieties of hard cheese, and of soft cheeses. They will be required to make at least one British Cheese of not less than 25 lbs. weight (or Stilton, 10 lbs.).

NOTE.—Candidates who pass in practical work only at the Butter and Cheese-making Examinations will not be required to again make Butter and Cheese at similar Examinations for which they may subsequently enter.

Candidates for a Teacher's Certificate must have been well trained, and will be required to make Butter and Cheese, and produce satisfactory evidence that they have received not less than twelve months' instruction at a Scientific Training Centre.

They will be expected to possess a detailed and precise knowledge of Sections 1 to 5 of the Syllabus, to understand the General Management and Feeding of Dairy Cattle, and to give evidence of their ability to Teach and Elucidate the Elementary Principles and Practice of Dairying.

Candidates for the Diploma must produce satisfactory evidence that they have received not less than one year's scientific and practical instruction at some recognised Centre for Dairying Instruction, and have spent at least twelve months on a Farm in addition to the time spent at the centre.

They will be required to make Butter and Cheese. They will be expected to possess a detailed and precise knowledge of all the Sections of the Syllabus, an elementary knowledge of Chemistry and Bacteriology in its relation to Soils,

Manures, Foods, and Dairy Produce; Botany, in its relation to Farm Plants; and Physiology and Veterinary Science in their relation to the Feeding and Treatment of Farm Stock in Health and Disease.

NOTE.—Candidates who have previously satisfied the Examiners in practical butter and cheese-making at a Diploma or Teacher's Examination will be excused practical work at subsequent Teacher's Certificate and Diploma Examinations for which they may enter.

Candidates are at liberty to bring their own utensils for the Practical Examination if they wish to do so.

Candidates are only eligible to be awarded the particular Certificate for which they enter.

Examinations for the Butter-making and Cheese-making Certificates will be held twice a year, viz., in the Spring and Autumn; and the Examinations for the Teachers' Certificates and Diplomas in the Autumn only.

SYLLABUS.

1. Milk.—The Yield of Milk from various breeds; the Production of Milk; Milking; Composition of Milk; Fluctuations in Yield and Quality, with their causes; the Nature and Properties of the Constituents of Milk: the Chemical Analysis of Milk; the Microscopical and Bacteriological Examination of Milk; Colostrum; Methods of Utilizing, Preserving, and Distributing Milk; Taints in Milk, their causes and cure.
2. Cream.—The Various Methods of Obtaining Cream; the Construction and Use of the Utensils employed—Separators; the Composition of Cream; the Analysis of Cream; the Ripening of Cream; the Chemical and Bacteriological Changes in Cream; the Preparation of Cream for Market; the Preparation of Cream for Butter-making; the Utilization of Separated or Skim-milk.
3. Butter.—The Various Methods of Obtaining Butter; the Utensils employed and the Principles involved; Conditions which affect the Butter Yield; Butter-milk; the Composition and Properties of Good Butter; Faults in Butter-making; the Chemical and Bacteriological Examination of Butter.
4. Cheese.—Rennet; the Action of Rennet on Milk; the Scientific Principles of Cheese-making and Cheese-ripening; the Chemistry and Bacteriology of Cheese; the Composition of Cheese and of the Bye-products of its Manufacture; the Detailed Principles and Practice for the Manufacture of One Variety of Hard Cheese; the General Practice of Manufacture of other Hard, and of Soft Cheeses; the Composition and Utilization of Whey; the Manufacture of Whey Butter.
5. The Keeping of Dairy Records, and the General Book-keeping of a Dairy.
6. Dairy Farming.—Its Principles and Practice, with the Management of the Dairy Farm; Implements and Machinery; Manures; Crops; Stock and Finances.
7. Crops and Feeding Stuffs.—The Cultivation, Manuring, Sowing, Reaping, and Harvesting of Farm Crops; their Composition and Utilization. Artificial Feeding Stuffs—their Production, Composition, and Utilization.
8. Live Stock.—The Varieties; Peculiarities; Breeding, Rearing, and Management of the Live Stock of a Farm.
9. Book-keeping of a Dairy Farm.

EXAMINATIONS AT LOCAL CENTRES.

In order to meet the convenience of pupils at Dairy Schools, members of local Societies, and other persons, the Association will conduct Examinations for its Diplomas and Certificates at any place in the United Kingdom upon receiving satisfactory proof that the following conditions will be observed :—

That the School, Society, County Council, or other body requesting such an Examination to be held, undertake to supply all necessary appliances and materials, and pay the fees and expenses of the Examiners. The milk supplied must be free from preservatives and fit for cheese-making.

In all cases two Examiners will be appointed. An additional Examiner may be required in the Examination for Diplomas.

Elementary Teacher's Certificate of Competency in Dairy Work.

The Association also grants to any Candidate who can satisfactorily pass the necessary Examinations :—

AN ELEMENTARY TEACHER'S CERTIFICATE FOR PROFICIENCY IN THE THEORY AND PRACTICE OF BUTTER-MAKING.

Such Certificates (as well as the Association's ordinary Certificates) will be accepted by the Right Honourable the Lords of the Committee of the Privy Council on Education for the purposes of Article 101 (*i*) of the Education Code, 1893, and Article 13 (*e*) of the Evening Continuation Schools Code. Candidates who must have undergone practical instruction in Butter-making for at least twenty days, will be required to show their practical skill in Butter-making, and to satisfactorily answer in writing, within a given time, a set of questions on the following subjects :—

1. Milk.—Its Production, Composition, and Properties. Methods of Testing, Preserving, Distributing, &c. The Utilization of Skim Milk.
2. Cream.—Its Production, Composition, and Properties.
3. Butter.—Its Production, Composition, and Properties.

Candidates will also be examined *viva voce*.

The Elementary Teacher's Certificates are in the following form :—

This is to certify that ________________ has attended the Dairy School Classes of the ________________________
at ________________ for a period of* ________________
viz., from ________________ to ________________
and has during the whole of that period undergone practical instruction in Butter-making ; that ____________ has received some instruction in the Theory of Butter-making, and has written a paper on the subject, displaying an intelligent knowledge thereof ; and that ____________ is consequently qualified to give instruction in the practice of Butter-making to children in Public Elementary Schools.

*Not less than 20 days.

Particulars and Entry Forms may be obtained of

The SECRETARY,

BRITISH DAIRY FARMERS' ASSOCIATION,

12, Hanover Square, London, W.

British Dairy Farmers' Association.

EXAMINATION FOR CERTIFICATES AT THE DAIRY DEPARTMENT COUNTY LABORATORIES, CHELMSFORD, ON MONDAY, TUESDAY, AND WEDNESDAY, JUNE 20TH, 21ST, AND 22ND, 1910.

EXAMINERS: MR. MILES BENSON and MR. F. J. LLOYD. F.C.S.

Three hours are allotted to Candidates for Dairy Teachers' Certificates, or both Butter and Cheese Making Certificates. Candidates will also be examined *viva voce*. Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are required to answer the following questions:—

FOR BUTTER AND CHEESE MAKING CERTIFICATE ..	NOS. 1—12
FOR DAIRY TEACHERS' CERTIFICATE	NOS. 1—15

QUESTIONS.

1. What are the principal constituents in milk?
2. Why does milk turn sour when kept, and what happens when it curdles?
3. What is the meaning of specific gravity? How can you determine that of milk and what should it be?
4. Compare the Shorthorn and Jersey as butter producers, showing average yield and composition of milk, and the amount of butter which can be produced therefrom.
5. What are the advantages obtained by ripening cream?
6. When washing the butter grains in the churn you should have four objects in view. What are these?
7. What is the visible difference between well made and badly made butter?
8. What are the three chief causes of butter not keeping?
9. What are the main factors which contribute towards the production of high-class cheese?

10. How would the following conditions affect the ripening of Cheddar cheese?—

    a. Over ripe milk.

    b. A curd not scalded for sufficient time.

    c. A curd in which acidity has not been sufficiently developed previous to pressing.

11. What are the chief difficulties which a cheese-maker has to contend with?

12. How would you make a quick-ripening cheese?

13. How would you demonstrate to a class that milk contained the constituents mentioned in your answer to question 1?

14. Write out notes for a lecture or lesson on bacteria to a class of junior dairy pupils.

15. State briefly some of the chief causes of taints in milk, butter, and cheese.

EXAMINATION FOR CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON THURSDAY, FRIDAY, AND SATURDAY, JUNE 2ND, 3RD, AND 4TH, 1910.

EXAMINERS: MR. WM. ASHCROFT, MR. ALEC. TODD, and MR. F. J. LLOYD, F.C.S.

Two hours are allotted to Candidates for Cheese-making, Butter-making, or Elementary Teachers' Certificates; and three hours to Candidates for both Butter and Cheese Making Certificates.

Candidates will also be examined *viva voce.* Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are required to answer the following questions:—

FOR BUTTER-MAKING OR ELEMENTARY TEACHERS' CERTIFICATES	Nos. 1 to 8, inclusive.
FOR CHEESE-MAKING CERTIFICATE	Nos. 1 to 4 and 9 to 12, inclusive,

QUESTIONS.

1. What would be the probable average composition of milk from herds of Shorthorns, Jerseys, and Ayrshires, and what quantity in each herd would you consider a good average per year?

2. What are the principal points to be observed in good milking ?
3. What is the meaning of specific gravity ? What is the average gravity of milk, and how do you take it ? If 10 per cent of water is subsequently added, what would be the effect ?
4. To what is the souring of milk due ? What will hasten or retard the same, and what changes will be produced ?
5. How and why do you ripen cream for butter-making ?
6. Describe a centrifugal cream separator with which you are familiar, and explain its action ?
7. What faults should you avoid in churning and making your butter ?
8. What is the composition of thick and thin cream, butter milk, butter, colostrum ?
9. In the month of June you are given a vat containing 100 gallons of milk for Cheddar cheese-making. How much curd, whey, and ripe cheese would you expect to get from this ? State also the composition of the curd, whey, and cheese.
10. Describe the management of milk for Cheddar cheese-making from the time it leaves the cowshed till it is ready for renneting.
11. In making hard cheese from April to October, would you vary the amount of acidity, rennet, and salt ? If so, why ?
12. Given five gallons of milk to be made into soft cheese which had to be marketed in five days, what cheese would you make, and how would you proceed ?

EXAMINATION FOR DIPLOMA AND CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING: ON TUESDAY, WEDNESDAY, THURSDAY, AND FRIDAY, SEPTEMBER 6TH, 7TH, 8TH, AND 9TH, 1910.

EXAMINERS: DR. THOMAS MILBURN, MR. JAMES MCCREATH, and MR. F. J. LLOYD, F.C.S.

Two hours are allotted to Candidates for Cheese-making, Butter-making, or Elementary Teachers' Certificates ; three hours to Candidates for both Butter and Cheese Making Certificates.

The written part of the Examination for the Diploma and Dairy Teachers' Certificates will be divided into two parts : the first three hours being devoted to the 12 questions contained on this sheet. After an interval of an hour and a half, Dairy Teacher Candidates will be allowed a further hour and Diploma Candidates two hours to answer additional questions.

Candidates will also be examined *viva voce.* Each question carries the same number of marks, and Candidates gaining over 60 per cent. will pass.

Candidates are required to answer the following questions:—

FOR BUTTER-MAKING OR ELEMENTARY TEACHERS' CERTIFICATE	Nos. 1 to 8, inclusive.
FOR CHEESE-MAKING CERTIFICATE	Nos. 1 to 4 and 9 to 12, inclusive.
FOR DAIRY TEACHERS' CERTIFICATE OR DIPLOMA	Nos. 1 to 12, inclusive.
FOR DAIRY TEACHERS' CERTIFICATE AND DIPLOMA	Second paper (as above stated).

QUESTIONS.

1. What are the constituents of milk? State the maximum and minimum of each *ordinarily* found.
2. What happens when you ventilate the churn? What if you fail to ventilate? State the cause in each case.
3. What influence has ripening on the constituents of cream and on the butter produced therefrom?
4. How do you distinguish taints produced by feeding from those produced by bacteria, and how would you treat such tainted milk (*a*) for butter-making; (*b*) for cheese-making?
5. How much butter would you expect from—
   100 lbs. Shorthorn milk (average quality)?
   100 lbs. Jersey milk (do.)?
   Would the fat lost be the same in each case?
6. Why is "grain" such an important factor in the making of butter?
7. What objects have you in view when washing and brining butter in the churn?
8. If you had only a very limited quantity of ice in hot weather, how would you use it?
9. What conditions determine the proportion of rennet required in the making of Cheddar cheese? Give reasons.
10. What is the object of obtaining a certain amount of acidity in the milk before renneting, in the whey before drawing, and in the curd before milling?
11. Name the chief causes of loss of fat in cheese-making.
12. How does the ripening of a soft cheese, *e.g.*, Camembert, differ from that of a hard cheese, *e.g.*, Cheddar?

Teacher and Diploma Candidates will be required to answer additional questions after an interval of one and a half hours.

SECOND PAPER.

Diploma Candidates will be allowed two hours to answer all of the following questions.

Dairy Teacher Candidates will be allowed one hour to answer questions Nos. 13-15 inclusive.

QUESTIONS.

13. Give the outlines of a short lecture on the mineral constituents of milk.

14. State briefly how you would give first notions of Bacteria and their work in dairying to an elementary class.

15. Assuming you were a teacher, what kind of record would you advise being kept—

    (*a*) Where milk is sold?

    (*b*) Where butter is made?

    (*c*) Where cheese is made?

16. What crops do you consider suitable for soiling purposes? State when each is sown, the amount of seed per acre, and the probable yield.

17. What are the chief root and cereal crops grown on a dairy farm?

18. What foods would you use (*a*) with skim milk for calves; (*b*) with whey for pigs? Give reasons.

19. How does dairy farming differ from arable farming as regards stocking, financing, and general turnover?

20. State what you know of epizootic abortion, its cause and cure.

1. What books would you keep on a dairy farm where tne milk of your own cows and of a neighbour's is used for butter and cheese making, and a few calves are reared?

EXAMINATION RESULTS, 1910.

EXAMINATION FOR TEACHERS', BUTTER-MAKING AND CHEESE-MAKING CERTIFICATES AT THE COUNTY DAIRY SCHOOL, CHELMSFORD, ON MONDAY, TUESDAY, AND WEDNESDAY, JUNE 20TH, 21ST, AND 22ND, 1910.

A Teacher's Certificate for Proficiency in the Science and Practice of Dairying to Gertrude M. Garrard and John Hodge.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making and Cheese-making to Katherine M. Lamb, Beatrice O. Nichols, Winifred L. Dorrington, and Agnes W. Crawford.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Edith S. Luckin.

EXAMINATION FOR BUTTER-MAKING AND CHEESE-MAKING CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON THURSDAY, FRIDAY, AND SATURDAY, JUNE 2ND, 3RD, AND 4TH, 1910.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making and Cheese-making to Miss A. L. Dean, George Lallemand, Miss Elsie Jones, Miss Mabel Grant, Madame Lily Vladoyano, and Miss Ella F. Evilts.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Justus W. George, Reginald W. Naylor, Robert Hart, Robert H. Tompkins, Willoughby V. Foot, Miss Florence M. Twose, William T. Clarke, and Miss G. M. Lloyd.

EXAMINATION FOR DIPLOMAS AND CERTIFICATES AT THE BRITISH DAIRY INSTITUTE, READING, ON TUESDAY, WEDNESDAY, THURSDAY, AND FRIDAY, SEPTEMBER 6TH, 7TH, 8TH, and 9TH.

A Diploma and Silver Medal for Proficiency in the Science and Practice of Dairying and Dairy Farming to Mahmood A. Khan, Madame Lily Vladoyano, Miss Elsie Jones, Willoughby V. Foot, Thomas B. Hewetson, Miss Mary J. Williams, Miss May E. Connell, and John Evens.

A Teacher's Certificate for Proficiency in the Science and Practice of Dairying to Miss Nellie Yeld.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making and Cheese-making to Miss Jane Williams.

A Certificate of Merit for Proficiency in the Theory and Practice of Cheese-making to Miss Florence M. Twose, Reginald W. Naylor, and Mahmood A. Khan.

A Certificate of Merit for Proficiency in the Theory and Practice of Butter-making to Miss Dora Price, Miss Elsie Lousley, and Miss Lorna C. P. Gordon-Allen.

AWARD OF PRIZES DAIRY SHOW, 1910.

DAIRY COWS AND HEIFERS IN MILK.

Class 1—SHORTHORN COWS.—Entered in or eligible for Coates' Herd Book, or its pedigree sent for such entry previous to the Show.—*First* Inspection Prize (£10), *Second* Milking Trial Prize (£10), and "Spencer" Challenge Cup to F. J. Stanhope, Alma House, Claybrooke, Rugby, for "Princess Ena." *Second* Inspection Prize (£5), *First* Milking Trial Prize (£20), Shorthorn Society's Prize (£10), and The Lord Mayor's Champion Cup to J. Ellis Potter, Moor Hall, Aughton, Ormskirk, for "Lady Heggle." *Third* Inspection Prize (£3) to F. J. Stanhope for "Favourite 3rd." *Third* Milking Trial Prize (£5) to Samuel Sanday, Puddington Hall, Chester, for "Englethorpe Amy 5th."

Class 2—SHORTHORN HEIFERS, not exceeding three years of age.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£5) to Lord Rothschild, Tring Park, Herts, for "Primrose Foggathorpe 11th." *Second* Inspection Prize (£3) and *First* Milking Trial Prize (£7) to Tom Hunter, Dolphinlee Farm, Lancaster, for "Lady Alexandra." *Third* Inspection Prize (£2) and *Second* Milking Trial Prize (£4) to Robt. W. Hobbs & Sons, Kelmscott, Lechlade, for "Marchioness 44th." *Third* Milking Trial Prize (£2) to George Taylor, Cranford, Middlesex, for "Waterloo Ruby 2nd."

Class 3—SHORTHORN COWS.—Not eligible for Class 1.—*First* Inspection Prize (£10) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Phyllis." *Second* Inspection Prize (£5) to Sam. S. Raingill, The Grange, Ringway, Altrincham, for "Dot." *Third* Inspection Prize (£3), *First* Milking Trial Prize (£20) and The "Barham" Challenge Cup to George B. Nelson for "Lady Wilson." *Second* Milking Trial Prize (£10) to E. S. Godsell, Salmon's Brewery, Stroud, Glos., for "Milkmaid." *Third* Milking Trial Prize (£5) to A. J. Hollington, Forty Hill, Enfield, for "Matchless."

Class 4—SHORTHORN HEIFERS, not exceeding three years of age.—Not eligible for Class 2.—*First* Inspection Prize (£5) and *First* Milking Trial Prize (£7) to Lord Lucas, Wrest Park, Ampthill, for "Marechal Neil." *Second* Inspection Prize (£3) to Sam. S. Raingill for "Meg." *Third* Inspection Prize (£2) to Robt. W. Hobbs & Sons for "Sybil 12th." *Second* Milking Trial Prize (£4) to Geo. B. Nelson for "Miss Blake."

Class 5—LINCOLNSHIRE RED SHORTHORN COWS.—Entered in or eligible for the Herd Book of the Lincolnshire Red Shorthorn Association.—*First* Inspection Prize (£10) to John Evens, Burton, near Lincoln, for "Burton Quality 5th." *Second* Inspection Prize (£5) and *Third* Milking Trial Prize (£5) to John Evens for "Burton Ruby 12th." *Third* Inspection Prize (£3) to John Evens for "Burton Ruby Spot 2nd." *Second* Milking Trial Prize (£10) to Charles E. Scorer, Whitehall, Bracebridge Heath, Lincoln, for "Bracebridge No. 3 B." *First* Milking Trial Prize (£20) to John Evens for "Burton Fuchsia 3rd."

Class 6—LINCOLNSHIRE RED SHORTHORN HEIFERS, not exceeding three years of age.—Entered in or eligible for the Herd Book of the Lincolnshire Red Shorthorn Association.—*First* Inspection Prize (£5) and *First* Milking Trial Prize (£7) to John Evens for "Burton Rose 11th." *Second* Inspection Prize (£3) to John Evens for "Burton Ruby Spot 7th." *Third* Inspection Prize (£2) to John Evens for "Lady Burton 3rd."

The Prizes in Class 6 are provided by the Lincolnshire Red Shorthorn Association.

Class 7—JERSEY COWS.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to A. Miller-Hallett, Goddington, Chelsfield, Kent, for "Vanilla 2nd." *Second* Inspection Prize (£4) and "The Blythwood" Perpetual Challenge Bowl to Arthur Pocock, Freegrove, Calne, Wilts, for "Freegrove Lily." *Third* Inspection Prize (£2) to Lord Rothschild for "Patrician." *First* Milking Trial Prize (£15) to J. H. Smith-Barry for "Marigold." *Second* Milking Trial Prize (£10) to Lord Rothschild for "Twylish 11th." *Third* Milking Trial Prize (£5) to J. H. Smith-Barry for "Malmsey."

Class 8—Jersey Heifers, not exceeding three years.—Bred in Great Britain or Ireland.—Entered in or eligible for the Herd Book.—*First* Prize (£7) to Dr. H. Corner, Brook House, Southgate, for "Mignonne's Reward." *Second* Prize (£4) to Joseph Brutton, 7, Princes Street, Yeovil, for "Electra." *Third* Prize (£2) to A. Miller-Hallett for "Goddington Pipkin 5th."

Class 9—Jersey Heifers, not exceeding three years of age.—Bred in Channel Islands.—Entered in or eligible for Jersey or English Jersey Herd Book.—*First* Prize (£7) to Lord Rothschild for "Mariposa's Lass." *Second* Prize (£4) to Lord Rothschild for "Victorine 4th." *Third* Prize (£2) to Wm. Alexander, Les Marais, St. Mary's, Jersey, for "Les Marais Fancy."

Class 10—Guernsey Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) to Sir E. A. Hambro, Hayes Place, Hayes, Kent, for "Hayes Olive." *Second* Inspection Prize (£4) to Sir E. A. Hambro for "Golden Cherry."

Class 11—(Cancelled).

Class 12—Red Poll Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7), *Third* Milking Trial Prize (£5) and *Extra* Prize (£5) offered by the Red Poll Cattle Society to Kenneth M. Clark, Sudbourne Hall, Orford, Suffolk, for "Sudbourne Belle Dotty 1st." *Second* Inspection Prize (£4) to A. Carlyle Smith, Ashmoor, Campsea Ashe, Wickham Market, for "Queen Mab." *Third* Inspection Prize (£2) to A. Carlyle Smith for "Rendlesham Florist." *First* Milking Trial Prize (£15) to the Earl of Radnor, Longford Castle, Salisbury, for "Mona." *Second* Milking Trial Prize (£10) to Kenneth M. Clark for "Sudbourne Queen 1st."

Class 13—Red Poll Heifers.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£5), *Third* Milking Trial Prize (£2) and *Extra* Prize (£5) offered by the Red Poll Cattle Society to J. B. Chevallier, Aspall Hall, near Debenham, for "Aspall Princess 1st." *Second* Inspection Prize (£3) to A. Carlyle Smith for "Ashmoor Miriam." *Third* Inspection Prize (£2) to Alfred J. Smith for "Rendlesham Belle." *First* Milking Trial Prize (£5) to J. B. Chevallier for "Aspall Pomona." *Second* Milking Trial Prize (£3) to Kenneth M. Clark for "Sudbourne Bess."

Class 14—Ayrshire Cows.—*First* Inspection Prize (£7) to Tom Hunter, Dolphinlee Farm, Lancaster, for "Dot." *Second* Inspection Prize (£4) to Wm. Nisbet, Lordship, Hinxton, Great Chesterford, for "Dalfibble Belle 2nd."

Class 15—South Devon Cows.—*First* Inspection Prize (£7) and *Second* Milking Trial Prize (£10) to Thomas Cundy, The Devonshire Dairy, Benbow Street, Stoke, Devonport, for "Iris." *Second* Inspection Prize (£4) and *Third* Milking Trial Prize (£5) to W. P. Vosper, Merafield, Plympton, for "Fancy 6th." *Third* Inspection Prize (£2) to W. & H. Whitley, Primley Farm, Paignton, for "Winsome." *First* Milking Trial Prize (£15) to Stanley Vosper, The Cottage, Plympton, for "Honesty 7th."

Class 16—Kerry Cows.—Entered in or eligible for the Herd Book.—*First* Inspection Prize (£7) and *First* Milking Trial Prize (Cup, £5) to Muriel, Countess De la Warr, Old Lodge, Nutley, Uckfield, Sussex, for "Buckhurst Peaceful." *Second* Milking Trial Prize (£3) to Muriel, Countess De la Warr, for "Buckhurst (Waterville) Saffhire."

Class 17—(Cancelled).

Class 18—Pair of Cows of any Breed or Cross (in milk).—*First* Prize (£20) to Geo. B. Nelson, Cockerham Hall, near Garstang, for "Royal" and "Rhoda" (Shorthorns). *Second* Prize (£15) to F. J. Stanhope, Alma House, Claybrooke, Lutterworth, for "Grace" and "Graceful" (Shorthorns). *Third* Prize (£10) to Sam S. Raingill, The Grange, Ringway, Altrincham, for "Countess" and "Duchess" (Shorthorns). *Fourth* Prize (£5) to W. R. Withers, Lower Court Farm, Long Ashton, Bristol, for "Favourite" and "Daisy" (Shorthorns). *Fifth* Prize (£3) to Tom Hunter for "Elsie" and "Gladys."

Class 19—SINGLE COW OF ANY BREED OR CROSS (in Milk).—*First* Prize (£10) to A. Stansfield, Calliard's Farm, Smithy Bridge, Rochdale, for "Rose." *Second* Prize (£7) to F. J. Stanhope for "Faithful." *Third* Prize (£5) to Tom Hunter for "Edna." *Fourth* Prize (£3) to Geo. B. Nelson for "Lily." *Fifth* Prize (£2) to Sam S. Raingill for "Primrose."

The animals in Classes 18 and 19 were used in connection with the Milkers' Contests.

BUTTER TESTS.

SHORTHORNS entered in Classes 1, 2, 3, 4, 5, and 6.—*First* Prize (£5) and Silver Medal to F. J. Stanhope for "Princess Ena." *Second* Prize (£2) and Bronze Medal to J. Ellis Potter for "Lady Heggle."

JERSEYS entered in Classes 7, 8, and 9, and eligible for the English Jersey Herd Book.—*First* Prize (Gold Medal or £10) to the Earl Cadogan, K.G., Culford Hall, Bury St. Edmunds, for "Ghezireh." *Second* Prize (Silver Medal and £5) to Lord Rothschild for "Twylish 11th." *Third* Prize (Bronze Medal and £3) to Arthur Pocock for "Freegrove Lily." Butter Prize (£1) to Mrs. Evelyn, Wotton House, Dorking, for "Duckwing."

ANY OTHER BREED entered in Classes 10 to 17 inclusive.—Prizes of £3 each to Tom Hunter for "Dot" (Ayrshire), to Thomas Cundy for "Goldencup" (South Devon). Prize of £1 to W. P. Vosper for "Fancy 6th" (South Devon).

BULLS.

Class 20—SHORTHORN BULLS, twelve months old or over.—Entered in or eligible for the Herd Book.—*First* Prize (£10) to E. S. Godsell, Salmon's Brewery, Stroud, Glos., for "Salmon's Dreadnought." *Second* Prize (£5) to Samuel Sanday, Puddington Hall, Chester, for "Oxford Record."

Class 21—JERSEY BULLS, above one year and not exceeding three years.—Entered in or eligible for the Herd Book.—*First* Prize (£10) to Arthur Pocock for "Prime Minister." *Second* Prize (£5) to A. Miller-Hallett for "Goddington Winks."

Class 22—BULLS OF ANY OTHER PURE BREED, twelve months old or over.—Entered in or eligible for the Herd Book.—Silver Medals to W. & H. Whitley for "Primley Chancellor" (South Devon), J. B. Chevallier for "Acton Dairyman" (Red Poll), H. Fitzwalter Plumptre, Goodnestone Park, Canterbury, for "Fleur-de-Lys" (Guernsey).

BREEDERS' PRIZES.

SILVER MEDAL TO EACH FIRST PRIZE COW, HEIFER, OR BULL IN THE SHOW.—To J. Blundell for Shorthorn Cow "Princess Ena"; John Dawson for Shorthorn Cow "Lady Heggle"; W. Forster for Shorthorn Heifer "Lady Alexandra"; T. Hunter for Shorthorn Heifer "Primrose Foggathorpe 11th"; J. W. Robinson for Shorthorn Cow "Phyllis"; John Thornburrow for Shorthorn Cow "Lady Wilson"; Lord Lucas for Shorthorn Heifer "Marechal Neil"; John Evens for Lincolnshire Red Shorthorn Cow "Burton Quality 5th"; John Evens for Lincolnshire Red Shorthorn Heifer "Burton Rose 11th"; J. G. Bodell for Jersey Cow "Vanilla 2nd"; J. H. Smith-Barry for Jersey Cow "Marigold"; Dr. H. Corner for Jersey Heifer "Mignonne's Reward"; A. P. Le Rossignol for Jersey Heifer "Mariposa's Lass"; Sir E. A. Hambro for Guernsey Cow "Hayes Olive"; The Earl of Radnor for Red Poll Cow "Mona"; Kenneth M. Clark for Red Poll Cow "Sudbourne Belle Dotty 1st"; J. B. Chevallier for Red Poll Heifer "Aspall Princess 1st"; Thomas Cundy for South Devon Cow "Iris"; W. P. Vosper for South Devon Cow "Honesty 7th"; W. H. Mullens for Kerry Cow "Buckhurst Peaceful"; E. S. Godsell for Shorthorn Bull "Salmon's Dreadnought"; Arthur Pocock for Jersey Bull "Prime Minister."

SHE-GOATS.

Class 23—MILKING CLASS FOR GOATS (any Variety).—*First* Prize (Silver Medal and £2 10s.) to Lady Acland, Killerton, Exeter, for "Killerton Garnet." *Second* Prize (£1 10s.) to Mrs. M. Handley Spicer, Old Moore's, Chobham, Surrey, for "Copthorne Orange." *Third* Prize (£1) to Geo. Walker, Honeymead, Wendover, Bucks, for "Blossom."

Class 24—GOATS OF ANY VARIETY that have won two or more *First* Prizes in Classes other than Kids or Goatlings, on or before September 5th, 1910.—*First* Prize (£2) to Mrs. M. Handley Spicer for "Sedgemere Cravate."

Class 25—TOGGENBURG OR OTHER SWISS PURE BREEDS.—Not eligible for Class 24. Over two years on October 1st, 1910.—*First* Prize (£2) to Mrs. M. Handley Spicer for "Copthorne March." *Second* Prize (£1) to Mrs. E. G. Barnett, Halton, Corbridge-on-Tyne, for "Sedgemere Cassandra."

Class 26.—ANGLO-NUBIAN SHE-GOAT.—Not eligible for Class 24. Over two years on October 1st, 1910.—*First* Prize (£2) to Miss Elsie Mortimer, Wigmore, Holmwood, Surrey, for "Bricket Tattle." *Second* Prize (£1) to Miss Elsie Mortimer for "Bricket Tawdry."

Class 27—ANY OTHER VARIETY SHE-GOAT.—Not eligible for previous classes. Over two years on October 1st, 1910.—*First* Prize (£2) to Mrs. M. Handley Spicer for "Copthorne Orange." *Second* Prize (£1) to Mrs. M. Handley Spicer for "Halton Heroine." *Third* Prize (10s.) to Dr. Clutterbuck, Maycroft, Surrenden Road, Brighton, for "Withdean Babette."

Class 28—GOATLINGS (any Variety), over twelve months and not over two years on October 1st, 1910.—*Equal First* Prizes of £2 each to Mrs. M. Handley Spicer for "Copthorne Greengage" and to Miss Pope, Bashley Lodge, New Milton, for "Grace." *Equal Second* Prizes of £1 each to Mrs. M. Handley Spicer for "Copthorne Reflex" and to Miss Elsie Mortimer for "Wigmore Topsy." *Equal Third* Prizes of 10s. each to Wm. A. Wilcox, Tally Ho Lodge, Basingstoke, for "Tally-Ho Theodora," and to Lady Gertrude Crawford, Coxhill, Lymington, Hants, for "Loxwood Lemonade"

Class 29—FEMALE KIDS (Swiss, including Toggenburg and Anglo-Swiss).—Not exceeding twelve months of age on October 1st, 1910.—*First* Prize (£2) to Mrs. M. Handley Spicer for "Copthorne Lemon." *Second* Prize (£1) to Mrs. Handley Spicer for "Copthorne Sultana." *Third* Prize (10s.) to Wm. A. Wilcox for "Tally-Ho Taffeta."

Class 30—FEMALE KIDS (Anglo-Nubian, or any other Variety).—*First* Prize (£2) to Sir Horace Regnart, Frith Manor, Mill Hill, for "Luxor Mary." *Second* Prize (£1) to Miss Elsie Mortimer for "Wigmore Thistle." *Third* Prize (10s.) to Miss Elsie Mortimer for "Wigmore Mayflower."

CHEESE (FOR MAKERS ONLY, RESIDING IN ANY PART OF THE UNITED KINGDOM).

Class 31.—CHEDDAR (4 Cheeses).—*First* Prize (£10) to W. C. Spencer, Manor Farm, Hillfield, Cattistock, Dorset. *Second* Prize (£7) to Francis Osborne, Catsley, Corscombe, Dorset. *Third* Prize (£5) to H. Travers, Middle Farm, Sutton Ditcheat. *Fourth* Prize (£3) to E. Brake, Discove Dairy, Bruton, Somerset. *Fifth* Prize (£2) to M. Portch, Redlynch Farm, Bruton.

Class 32—CHEDDAR (20 Cheeses).—*First* Prize (Silver Medal and £10) to W. C. Spencer. *Second* Prize (£7) to G. D. Templeman, Hambridge, Taunton. *Third* Prize (£5) to H. Travers, Middle Farm, Sutton Ditcheat. *Fourth* Prize (£3) to M. Portch. *Fifth* Prize (£2) to J. Sage, Batcombe, Evercreech.

Class 33—CHEDDAR TRUCKLES (8 Cheeses).—*First* Prize (£3) to W. C. Spencer. *Second* Prize (£2) to W. C. Spencer. *Third* Prize (£1) to H. Travers.

Class 34—Cheshire (4 Coloured Cheeses, not less than 40 lbs. each).—*First* Prize (£10) to Chas. Fredk. Hobson, Weston Hall, Eccleshall, Staffs. *Second* Prize (£5) to John H. Bourne, Baddington, Nantwich, Cheshire. *Third* Prize (£2) to W. H. Hobson, Blakenhall, Nantwich.

Class 35—Cheshire (4 Uncoloured Cheeses, not less than 40 lbs. each).—*First* Prize (£10) to George Watson, Knightley, Eccleshall, Stafford. *Second* Prize (£5) to W. H. Hobson. *Third* Prize (£2) to Chas. Fredk. Hobson.

Class 36—Cheshire (20 Cheeses).—*First* Prize (Silver Medal and £10) to Frederick Dale, Frith Farm, Wrenbury, Nantwich. *Second* Prize (£5) to J. Craddock, Ebnol Hall, Malpas, Cheshire. *Third* Prize (£3) to W. H. Hobson. *Fourth* Prize (£2) to Geo. Lewis, Fernhill Dairy, Market Drayton, Salop.

Class 37—Stilton (8 Cheeses).—*First* Prize (£10) to Belvoir Vale Dairies, Harby, Melton Mowbray. *Second* Prize (£5) to Joseph Rigby, South Croxton, Leicester. *Third* Prize (£2) to Mrs. Charlotte Fairbrother, Beeby.

Class 38—Stilton (36 Cheeses).—*Equal First* Prize (Silver Medal and £6 each) to Joseph Rigby and Belvoir Vale Dairies. *Third* Prize (£2) to Tuxford & Nephews, Thorpe End Dairy, Melton Mowbray.

Class 39—Wensleydale (Stilton-shaped or Flat, 8 Cheeses).—*First* Prize (£5) to Mrs. Willis, Manor House, Carperby, S.O., Yorks. *Second* Prize (£3) to British Dairy Institute, Reading. *Third* Prize (£2) to Anthony Harker, Myrtle Grove Dairy, Carperby, S.O., Yorks.

Class 40—Lancashire (4 Cheeses).—*First* Prize (£5) to Joseph Shepherd, Lower House, Inglewhite, Preston. *Second* Prize (£3) to William Kirkby, Catforth Hall, Preston, Lancs. *Third* Prize (£2) to Geo. Whitaker & Son, Gibson's Farm, Kirkland, Garstang, Lancs.

Class 41—Double Gloster (4 Cheeses, from 26 lbs. to 30 lbs. each, total weight not to exceed 120 lbs.).—*First* Prize (£5) to George Prout, Standish Court Farm, near Stonehouse, Glos. *Second* Prize (£3) to Charles Harris & Son, Rectory Farm, Slimbridge, Stonehouse, Glos. *Third* Prize (£2) to William H. Weekes, Falfield, R.S.O., Glos.

Class 42—Single Gloster (4 Cheeses, from 13 lbs. to 15 lbs. each, total weight not to exceed 60 lbs.).—*First* Prize (£3) to George Prout. *Second* Prize (£2) to Miss Westaway, Manor Farm, Burton, near Berkeley. *Third* Prize (£1) to Charles Harris & Son.

Class 43—Leicester (4 Cheeses).—*First* Prize (£3) to Joseph Rigby. *Second* Prize (£2) to Joseph Rigby. *Third* Prize (£1) to Yoxall and District Co-operative Dairy Society, Limited, Yoxall, Burton-on-Trent.

Class 44—Derby (4 Uncoloured Cheeses, not less than 25 lbs. each).—*First* Prize (£3) and Lord Mayor's Champion Cup, £10 10s.) to Yoxall and District Co-operative Dairy Society, Ltd., Yoxall, Burton-on-Trent. *Second* Prize (£2) to Yoxall and District Co-operative Dairy Society, Ltd. *Third* Prize (£1) to Gratton Cheese Factory Association, Gratton, Winster, Matlock, Derby.

Class 45—Caerphilly (4 Cheeses, not exceeding 8 lbs. each).—*First* Prize (£3) to Wilts United Dairies, Ltd., Devizes, Wilts. *Second* Prize (£2) to Wilts United Dairies, Ltd. *Third* Prize (£1) to G. Bailey, Badgworth, Axbridge, Somerset.

Class 46 —Cream Cheese (made from pure Cream only; no milk or curd to be added; 6 Cheeses).—*Two Equal First* Prizes (£1 each) both to Mid-Sussex Dairy Co., Ltd., Sheffield Park Station, Lewes. *Two Equal Second* Prizes (10s. each respectively) to The Glynde Creameries, Ltd., Glynde, near Lewes, and Sir G. A. Cooper, Bt., Hursley Park, Winchester.

Class 47—Gervais (6 Cheeses).—*First* Prize (£1) to Tunks & Tisdall, Ltd., Holland Park Dairy, Kensington, W. *Second* Prize (10s.) to Tunks & Tisdall, Ltd.

Class 48—Unripened Soft Cheese (other than Cream Cheese or Gervais, made direct from milk; 4 Cheeses).—*First* Prize (£1) to Alfred Rowntree, Kirkby Overblow, Pannal and Masham, Yorks. *Second* Prize (10s.) to Offord D. Carter, 23, Church Street, Ilfracombe.

BACON AND HAMS.

(Open to Curers only, residing in any part of the United Kingdom.)
(Classes 58, 59, and 60 excepted.)

Class 51—Pale Dried Bacon (4 Hamless Sides).—*First* Prize (Silver Medal) to Joseph Smith, Cummersdale, near Carlisle. *Second* Prize (Bronze Medal) to Joseph Smith.

Class 52—Smoked Bacon (4 Sides, mild cured in Wiltshire style, with Ham attached).—*First* Prize (Silver Medal) to Cornish Meat and Provision Co., Redruth, Cornwall. *Second* Prize (Bronze Medal) to Roscrea Bacon Factory, Ltd., Roscrea, Co. Tipperary.

Class 53—Pale Dried Bacon (4 Sides, mild cured in Wiltshire style, with Ham attached).—*First* Prize (Silver Medal) to Cornish Meat and Provision Co. *Equal Second* Prize (Bronze Medal) to Roscrea Bacon Factory, Ltd., and Cornish Meat and Provision Co.

Class 54—Pale Dried Hams (4 Hams, long cut, not over 14 lbs. weight).—*First* Prize (Silver Medal) to Joseph Smith. *Second* Prize (Bronze Medal) to Palethorpes, Ltd., Dudley Port, Staffs.

Class 55—Pale Dried Hams (4 Hams, long cut, over 14 lbs. weight).—*First* Prize (Silver Medal) to Joseph Smith. *Second* Prize (Bronze Medal) to Palethorpes, Ltd.

Class 56—Smoked Hams (4 Hams, long cut, mild cured, not over 15 lbs. weight).—*First* Prize (Silver Medal) to S. Ward, Ltd., 219, 223, Broad Street, Birmingham. *Second* Prize (Bronze Medal) to Cook & M'Neily, Sligo, Ireland.

Class 57—Pale Dried Hams (4 Hams, long cut, mild cured, over 15 lbs. weight).—*First* Prize (Silver Medal) to Joseph Smith. *Second* Prize (Bronze Medal) to Joseph Smith.

Class 58—Smoked Hams (4 Hams, cured in Ireland, under 14 lbs. weight).—*Two Equal First* Prizes (Silver Medals) to Cook & M'Neily, Sligo, Ireland, and to Roscrea Bacon Factory, Ltd.

Class 59—Two Hams (cured in the Farmhouse Home; professional bacon curers not eligible).—*First* Prize (£2) to Joseph Rigby, South Croxton, Leicester. *Second* Prize (£1) to Capt. R. Oliver Bellasis, Shilton, Coventry.

Class 60—Selling Class for Hams, any variety (2 Hams).—*First* Prize (£2) to Palethorpes, Ltd. *Second* Prize (£1) to S. Ward, Ltd. *Third* Prize (10s.) to Palethorpes, Ltd.

BUTTER.

Class 61—Butter (perfectly free from salt, the produce of Channel Islands Cattle and their Crosses; 2 lbs., in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Edward Vaughan, Barton Grange, Taunton; Mrs. Frank Ward, Burnville, Tavistock; Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon. *Three Equal Second* Prizes (£2 each) to Mrs. G. B. Robinson, Poole House Farm, Nantwich; Ernest Callard, Little Missenden Abbey, Bucks.; and Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Third* Prizes (£1 each) to C. Whicher, West Stoke, Chichester; Mrs. Faith Holden, Nixon's Farm, Deane, Bolton; and Mrs. Crawford, Cor House Farm, Norton-on-Tees, Durham.

Class 62—Butter (slightly salted, the produce of Channel Islands Cattle and their Crosses; 2 lbs., in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. G. B. Robinson, Poole House Farm, Nantwich; Mrs. W. Irving, Toppin Castle, Heads Nook, Carlisle; and Mrs. Amelia Underwood, Little Gaddesden, Berkhamsted. *Three Equal Second* Prizes (£2 each) to Charles E. Keyser, Aldermaston Court, near Reading; Edward Vaughan, Barton Grange, Taunton; and Mrs. Caroline Franklin, Chartridge Lodge, Chesham. *Three Equal Third* Prizes (£1 each) to C. Whicher, West Stoke, Chichester; Mrs. Frank Ward, Burnville, Tavistock; and Mrs. L. R. Mildon, Higher Mead Road, Rackenford, Morchard Bishop, Devon.

Class 63—Butter (perfectly free from salt, the produce of Shorthorn and other Cattle and their Crosses, except Channel Islands and their Crosses; 2 lbs., in 1 lb. lumps).—*Three Equal First* Prizes (£3 each) to Mrs. G. B. Robinson, Pool House Farm, Nantwich; Mrs. Frank Ward, Burnville, Tavistock; and Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon. *Three Equal Second* Prizes (£2 each) to Mrs. W. Irving, Toppin Castle, Heads Nook, Carlisle; Mrs. Faith Holden, Nixon's Farm, Deane, Bolton; and Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Three Equal Third* Prizes (£1 each) to Mrs. A. A. Bere, Stoodleigh Barton, near Tiverton; Viscount Portman, Bryanston, Blandford; and Mrs. J. H. Hearn, Churchtown, Sydenham Damerel, Devon.

Class 64—Butter (slightly salted, the produce of Shorthorn and other Cattle and their Crosses, except Channel Islands and their Crosses; 2 lbs., in 1 lb. lumps). —*Three Equal First* Prizes (£3 each) to Mrs. G. B. Robinson, Pool House Farm, Nantwich; Mrs. Frank Ward, Burnville, Tavistock; and Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishops, Devon. *Three Equal Second* Prizes (£2 each) to Mrs. M. Stokes, Heddon House Dairy, Wylam-on-Tyne, Northumberland; Mrs. G. Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset; and Miss C. Lewis, Hanlon Farm, Haverfordwest, Pembrokeshire. *Three Equal Third* Prizes (£1 each) to Mrs. John Way, West Bridge, Bishops Nympton, South Molton, North Devon; Mrs. Edward Watts, Ty Ucha, Llantrithyd, Cowbridge; and Mrs. J. Buckborough, Bank End Farm, Arthington, near Leeds.

Class 65—Butter (slightly salted; 2 lbs., in 1 lb. lumps).—*First* Prize (£3) to Mrs. Frank Ward, Burnville, Tavistock. *Second* Prize (£2) to Mrs. J. H. Hearn, Churchtown, Sydenham Damerel, Devon. *Three Equal Third* Prizes (£1 each) to Tunks & Tisdall, Ltd., Holland Park Dairy, Kensington, W.; Mrs. Caroline Franklin, Chartridge Lodge, Chesham; and H. P. Sturgis, Givons, Leatherhead, Surrey.

Class 66—Butter (free from salt, or slightly salted, at the discretion of the Exhibitor: to be made from scalded Cream only; 2 lbs., in 1 lb. lumps).—*Two Equal First* Prizes (£3 each) to Mrs. A. A. Bere, Stoodleigh Barton, near Tiverton; and Mrs. George Adlam, Bubwith Farm, Wookey Hole, Wells, Somerset. *Second* Prize (£2) to Mrs. L. R. Mildon, Higher Mead Down, Rackenford, Morchard Bishop, Devon. *Third* Prize (£1) to Mrs. G. B. Robinson, Poole House Farm, Nantwich.

Class 67—Fresh Butter (free from salt; in 24-lb. boxes of 12 Rolls; Packages (non-returnable) to be taken into consideration; the Rolls not to be separately wrapped).—*Two Equal First* Prizes (£1 each) to Springfield Co-operative Agricultural and Dairy Society, Ltd., Enniskillen, Co. Fermanagh; and Drumholm Co-operative Agricultural and Dairy Society, Bridgetown, Co. Donegal. *Third* Prize (£2) to Granagh Co-operative Dairy Society, Ltd., Ballingarry, Co. Limerick. *Fourth* Prize (£1) to Mrs. C. M. McIntosh, Havering Park, Romford, Essex. *Fifth* Prize (10s.) to Mrs. A. A. Bere, Stoodleigh Barton, near Tiverton.

Class 68—Mild-cured Butter (in Boxes of 24 Rolls of 1 lb. each, slightly salted; Packages (non-returnable) to be taken into consideration; wrapping allowed.) —*First* Prize (£5) to Charles Prideaux, The Grange, Motcombe, Dorset. *Second* Prize (£3) to Drumholm Co-operative Agricultural and Dairy Society, Bridgetown, Co. Donegal. *Third* Prize (£2) to Newcastle West Co-operative Dairy Society, Newcastle West, Co. Limerick. *Fourth* Prize (£1) to Ardagh Co-operative Dairy Society, Ltd., Ardagh, Co. Limerick. *Fifth* Prize (10s.) to Springfield Co-operative Agricultural and Dairy Society, Ltd., Inniskillen, Co. Fermanagh.

Class 69—Cured Butter (not less than 28 lbs., slightly salted; Packages (non-returnable) to be taken into consideration).—*First* Prize (£5) to Pomeroy Co-operative Agricultural and Dairy Society, Ltd., Pomeroy, Co. Tyrone. *Second* Prize (£3) to Miss C. Lewis, Hanlon Farm, Haverfordwest, Pembroke.

shire. *Third* Prize (£2) to Aghadowey Co-operative Agricultural and Dairy Society, Ltd., Drumcroone, Coleraine. *Fourth* Prize (£1) to Ballyvistea Co-operative Dairy Society, Ltd., Emly, Co. Tipperary. *Fifth* Prize (10s.) to Ardagh Co-operative Dairy Society, Ltd., Ardagh, Co. Limerick.

Class 70—Cured Butter (56 lbs.; Packages (non-returnable) to be taken into consideration).—*First* Prize (£5) to Killeter Co-operative Agricultural and Dairy Society, Ltd., Castlederg, Co. Tyrone. *Second* Prize (£3) to Moneymore Co-operative Agricultural and Dairy Society, Ltd., Moneymore, Co. Derry. *Third* Prize (£2) to Aghadowey Co-operative Agricultural and Dairy Society, Ltd., Drumcroone, Coleraine. *Fourth* Prize (£1) to Newcastle West Co-operative Dairy Society, Newcastle West, Co. Limerick. *Fifth* Prize (10s.) to Ballyvistea Co-operative Dairy Society, Ltd., Emly, Co. Tipperary.

Class 71—Fancy or Ornamental Design in Butter (with Foliage or other extraneous decoration).—*First* Prize (£3) to Miss H. M. Trenchard, Uphay Farm, Axminster. *Second* Prize (£2) to Mrs. R. Giddings, High Street, Erchfont, Devizes, Wilts. *Third* Prize (£1) to Miss Laura Ramsden, Armytage Arms Farm, Clifton, near Brighouse, Yorks.

Class 72—Fancy or Ornamental Design in Butter (without extraneous decoration, adapted for table use).—*First* Prize (£3) to Miss H. M. Trenchard, Uphay Farm, Axminster. *Second* Prize (£2) to Mrs. Crawford, Cor House Farm, Norton-on-Tees, Durham.

COLONIAL BUTTER.

Class 73—Salt Butter (one Box, containing not less than 56 lbs.).—*First* Prize (Silver Medal and £5) to Pommer Bros., Ipswich, Queensland. *Second* Prize (Bronze Medal and £3) to Government of South Australia, Government Produce Department, South Australia. *Third* Prize (£2) to Maryborough Co-operative Dairy Co., Ltd., Kingaroy, Queensland.

Class 74—Fresh Butter (one Box, containing not less than 56 lbs.).—*First* Prize (Silver Medal and £5) to Euroa Butter and Ice Factory, Ltd., Euroa, Victoria Australia. *Second* Prize (Bronze Medal and £3) to Traralgon Butter Factory, Traralgon, Victoria, Australia. *Third* Prize (£2) to Framlingham Butter Factory, Framlingham, Victoria, Australia.

CREAM.

Class 75—Clotted Cream (in vessels ready for sale; not less than 2 lbs., nor more than 3 lbs., in one or more vessels).—*First* Prize (Silver Medal) to James Pepperell, Belle Vue Dairy, Sidmouth. *Second* Prize (Bronze Medal) to Mrs. L. R. Mildon.

Class 76—Cream, other than Clotted (in vessels ready for sale; not less than 2 lbs. nor more than 3 lbs., in one or more vessels).—*First* Prize (Silver Medal) to Miss E. G. Everest, Chippen's Bank, Hever, Kent. *Second* Prize (Bronze Medal) to Henry Edwards & Son, Ltd., The Creameries, Market Drayton.

Special Prizes given by George Barbour, Esq., J.P. (President 1910).

Awarded to the Exhibitor gaining the greatest combined number of points in the Classes for Cheese.—*First* Prize (£12) to W. C. Spencer. *Second* Prize (£6) to Joseph Rigby, South Croxton, Leicester.

Awarded to the Exhibitor gaining the greatest combined number of points for Bacon and Hams.—*First* Prize (£5) to Joseph Smith. *Second* Prize (£3) to Cornish Meat and Provision Co. *Third* Prize (£2) to Roscrea Bacon Factory, Ltd., Roscrea, Ireland.

Awarded to the Exhibitor gaining the greatest combined number of points for Butter and Cream.—*First* Prize (£8) to Mrs. L. R. Mildon. *Second* Prize (£4) to Mrs. Frank Ward, Burnville, Tavistock.

GOLD MEDAL given by the Dairy Students' Union for Hard-pressed or Blue-veined Cheese, awarded to Geo. W. Symonds, Wilts United Dairies, Ltd., Devizes.

SILVER MEDAL given by the Dairy Students' Union for Butter, awarded to Miss Iris L. Bull, The Dairy, Hursley Park, Winchester.

THE "ELKINGTON" CUP, for Best Exhibit of Butter in Classes 61 to 64, awarded to Mrs. Frank Ward, Burnville, Tavistock.

SKIM-MILK BREAD AND SCONES.

(Mixed with Skim-milk in lieu of Water.)

Class 77—WHITE BREAD (2 Loaves, not exceeding 2 lbs. each).—*First* Prize (Silver Medal) to Percy K. Broad, Station Avenue, Caterham, Surrey. *Second* Prize (Bronze Medal) to H. W. Dunn, 6, Broadway, Crouch End.

Class 78—BROWN BREAD (2 Loaves, not exceeding 2 lbs. each).—*First* Prize (Silver Medal) to H. Davis & Sons' Steam Bakery, Maidstone, Kent. *Second* Prize (Bronze Medal) to Ernest B. Cox, 2, Surbiton Park Terrace, Kingston-on-Thames.

Class 79—FANCY BREAD (not exceeding 4 lbs.).—*First* Prize (Silver Medal) to Albion Bakeries, 287, High Road, Kilburn. *Second* Prize (Bronze Medal to F. J. Paine, Dulwich Park Bakery, 375, Lordship Lane, East Dulwich.

Class 80—HOME-MADE BREAD (2 Loaves, not exceeding 2 lbs. each). Bakers or their families not eligible to compete in this class.—*First* Prize (Silver Medal) to Mrs. Ella Lloyd, 24, Melville Street, Great Lever, Bolton. *Second* Prize (Bronze Medal) to Mrs. Ella Lloyd.

Class 81—TWELVE SCONES, BAKED ON GIRDLE OR PLATE, OR IN OVEN (any shape; not exceeding 6 ozs. each; without Fruit).—*First* Prize (Silver Medal) to F. J. Paine, Dulwich Park Bakery, East Dulwich. *Second* Prize (Bronze Medal) to The Albion Bakeries, 287, High Road, Kilburn, N.W.

HONEY, WAX, &c.

Class 82—TWELVE JARS OF LIGHT-COLOURED EXTRACTED HONEY (1 lb. each, approximate weight).—*First* Prize (£1) to R. H. Millington, Mistanswick, Market Drayton. *Second* Prize (15s.) to H. R. Baynes, 51, Bridge Street, Cambridge. *Third* Prize (12s. 6d.) to J. Boyes, Queen's Head Hotel, Cardiff. *Fourth* Prize (10s.) to W. T. Gunter, Plas Ken, Cowbridge, South Wales.

Class 83—TWELVE JARS OF MEDIUM-COLOURED EXTRACTED HONEY, OTHER THAN HEATHER HONEY (1 lb. each, approximate weight).—*First* Prize (£1) to R. H. Baynes. *Second* Prize (15s.) to A. J. Harris, Portland House, Evenlode, Moreton-in-Marsh. *Third* Prize (12s. 6d.) to E. C. R. White, Manor Farm, Newton Toney, near Salisbury. *Fourth* Prize (10s.) to F. W. Frusher, Swiss Apiary, Crowland, Peterborough.

Class 84—TWELVE JARS OF DARK-COLOURED EXTRACTED HONEY, INCLUDING ANY VARIETY OF HEATHER MIXTURE (1 lb. each, approximate weight).—*First* Prize (15s.) to E. C. R. White.

Class 86—TWELVE JARS OF GRANULATED HONEY OF 1909 OR ANY PREVIOUS YEAR (1 lb. each, approximate weight).—*First* Prize (£1) to Mrs. A. Turner, Broadway, Amersham. *Second* Prize (10s.) to Richard Allen, Tusmore Park, Bicester, Oxon. *Third* Prize (7s. 6d.) to E. Church, Masonic Temple, Cardiff.

Class 87—TWELVE SECTIONS OF HONEY OTHER THAN HEATHER (Size, $4\frac{1}{4}$ by $4\frac{1}{4}$; 1 lb. each, approximate weight).—*First* Prize (£1) to T. G. Hillier, Hurstbourne Tarrant, Andover. *Second* Prize (15s.) to R. Brown & Son, Flora Apiaries, Somersham. *Third* Prize (10s.) to James Pearman, Penny Long Lane, Derby.

Class 88—Six Sections of Heather Honey (1 lb. each, approximate weight).—*First* Prize (£1) to Mrs. E. Seadon, S.J.B. Apiary, Bromley, Kent. *Second* Prize (15s.) to J. Lamboll, Chiddingfold, Surrey.

Class 89—Display of Comb and Extracted Honey of any Year (approximate 100 lbs. in weight, shown on a space 3 ft. by 3 ft.).—*First* Prize (£2) to James Lee & Son, 4, Martineau Road, Highbury, N. *Second* Prize (£1 5s.) to R. Brown & Son, Somersham, St. Ives, Hunts.

Class 90—Wax (not less than 2 lbs., in 2 cakes only; the produce of Exhibitor's Apiary; extracted and cleaned by the Exhibitor or his assistants).—*First* Prize (15s.) to James Pearman. *Second* Prize (10s.) to Goodburn Bros., Millfield, Peterborough. *Third* Prize (7s. 6d.) to James Lee & Son.

Class 91—Wax (not less than 3 lbs., the produce of the Exhibitor's Apiary; extracted and cleaned by the Exhibitor or his assistants; shown in shape, quality, and package suitable for the retail trade).—*First* Prize (15s.) to Goodburn Bros. *Second* Prize (10s.) to John Berry, The Apiary, Llanrwst, North Wales.

Class 92—Interesting and Instructive Exhibit of a Practical or Scientific Nature connected with Bee Culture (not mentioned in the foregoing classes).—*First* Prize (15s.) to George Hayes, Melhurst, Mona Street, Beeston, Nottingham.

ROOTS, &c.

Information must be given on the Entry Form as to the soil in which the roots, &c., are grown; also the name of seed and manurial treatment. All mangolds and swedes must bear at least 3 inches of leaf.

Class 93.—Six Specimens of Long Mangolds (drawn from a crop of not less than 2 acres).—*First* Prize (£3) to Mrs. E. Ashley, Prospect House, Irlam, Manchester. *Second* Prize (£2) to Thomas Simpson, Bucklow Hill Farm, Plumbley, Cheshire. *Third* Prize (£1) to Caversham Urban District Council, Caversham, Reading.

Class 94—Six Specimens of Globe Mangolds (drawn from a crop of not less than 2 acres).—*First* Prize (£3) to Frank Horne, Salter's Hall, Bobbington, near Stourbridge. *Second* Prize (£2) to J. Bowden, Lanceleny Farm, Sherfield, Basingstoke. *Third* Prize (£1) to W. Watts, Sheep Court, Bonvilstone, Cardiff.

Class 95—Six Specimens of Golden or Crimson Tankard Mangolds (drawn from a crop of not less than 2 acres).—*First* Prize (£3) to H. Dent Brocklehurst, Sudeley Castle, Winchcombe, Glos. *Second* Prize (£2) to Harry Row, Corner Farm, Hemel Hampstead. *Third* Prize (£1) to James Smith, Town Hall, Buckingham.

Class 96—Six Specimens of Intermediate Mangolds (drawn from a crop of not less than 2 acres).—*First* Prize (£3) to Frank Horne, Salter's Hall, Bobbington, near Stourbridge. *Second* Prize (£2) to J. Bowden, Lanceleny Farm, Sherfield, Basingstoke. *Third* Prize (£1) to Andrew Weir, Puckeridge, Herts.

Class 97—Six Specimens of Swedes, any Variety (drawn from a crop of not less than 2 acres).—*First* Prize (£3) to Mrs. E. Ashley, Prospect House, Irlam, Manchester. *Second* Prize (£2) to J. C. Webster, Beetham Hall, Milnthorpe, Westmorland. *Third* Prize (£1) to Abraham Gregory, Heathcroft Farm, Saighton, Chester.

Class 98—Collection of Roots, &c., for Cattle Feeding in Winter (consisting of Six Specimens of as many as possible of the following: Mangolds, Swedes, Turnips, White Carrots, Red Carrots, Potatoes, Beetroot, Kale, Kohl-rabi, Parsnips, and Cabbage).—*First* Prize (£5) to Mrs. C. McIntosh, Havering Park, Romford. *Second* Prize (£3) to Lady Wantage, Lockinge House, Wantage. *Third* Prize (£2) to Percy E. Mead, Grubblecott, Tring.

INVENTIONS, &c.

Class 99.—ANY NEW INVENTION RELATING TO THE DAIRY INDUSTRY, OR ONE SHOWING DISTINCT AND PRACTICAL IMPROVEMENT (not eligible for competition in any other Class, and not previously exhibited at the Dairy Show).—*Silver* Medals to A. Grabham & Co., 139, Englefield Road, Essex Road, N., for Machine for the Washing and Sterilising of large quantities of Milk Bottles and Milk Bottle Cases; Martin's Cultivator Co., Ltd., Lincolnshire Iron Works, Stamford, for Combined Side-Delivery Rake, Swath Turner and Tedder; The Wolseley Sheep Shearing Machine Co., Ltd., Witton, Birmingham, for the "Britannic" Patent Cream Separator. *Bronze* Medals to Stanley R. Docking for Delivery Churn; R. A. Lister & Co., Ltd., Dinsley, Glos., for the "Dreadnought" Bottle Filler and Capper.

BUTTER-MAKING CONTESTS.

Class 100—SECTION A (open to those who have never won a prize at any Show, wherever held).—*First* Prize (£3) to Miss Ruby O'Brien, Munster Institute, Cork. *Second* Prize (£2) to Miss Nora Bradley, Webton Court, Madley, near Hereford. *Third* Prize (£1) to Miss Winifred Holton, Hillside, Henswick, Newbury.

Class 100—SECTION B.—*First* Prize (£3) to Miss Eileen Coughlan, Munster Institute, Cork. *Second* Prize (£2) to Miss Catherine L. Owen, Cromhowell Llanon, Carmarthen. *Third* Prize (£1) to Miss K. Simon, Hoarstone, Prees, Whitchurch.

Class 101—Open to Students who attended Classes at the British Dairy Institute, Reading, for not less than one month during the past two years.—*First* Prize (£3) to Miss Ethel Edgar, Old Place, East Tisted, Alton, Hants. *Second* Prize (£2) to Miss May Twose, 54, London Road, Reading. *Third* Prize (£1) to Miss Winifred Holter, Hillside, Henwick, Newbury.

Class 102—SECTION A (open to Men and Women).—*First Prize* (£3) to Miss Grace E. White, Widdington Farm, Noak Hill, Romford. *Second* Prize (£2) to Miss I. L. Bull, Hursley Park Dairy, Winchester. *Third* Prize (£1) to Miss F. Underwood, The Grange Farm, Cople, near Bedford.

Class 102—SECTION B.—*First* Prize (£3) to Miss Nellie Bennion, Daisy Bank Farm, Barthomley, near Crewe. *Second* Prize (£2) to Miss W. Dunn, Court Barton, Creech, Taunton. *Third* Prize (£1) to Miss E. J. Hockley, Cooper's Farm, Takeley, Essex.

Class 102—SECTION C.—*First* Prize (£3) to Miss Minnie Baldwin, Oldbury House, Lower Broadheath, Worcester. *Second* Prize (£2) to Miss H. M. Trenchard, Uphay Farm, Axminster, Devon. *Third* Prize (£1) to Miss M. E. Connell, The Mirlaun College, Kingston, Derby.

Class 102—SECTION D.—*First* Prize (£3) to Miss Hettie Parker, Old Holts Farm, Harwood, Bolton. *Second* Prize (£2) to Miss Ethel M. Dunn, Court Barton, Creech, St. Michael, Taunton. *Third* Prize (£1) to Miss L. Davies, Treowen, near Monmouth.

Class 103—Open to Members of the Dairy Students' Union.—The "Hackett" Silver Challenge Cup and Silver Medal to Miss Iris L. Bull, Hursley Park Dairy, Winchester.

Class 104—Open to First Prize Dairy Show Winners of 1910.—*First* Prize (£3) to Miss Grace E. White. *Second* Prize (£2) to Miss Nellie Bennion. *Third* Prize (£1) to Mrs. Ethel Edgar.

Class 105—CHAMPION CONTEST (open to Winners of *First* Prizes in the preceding Classes, or at the Dairy Show, 1909. Champions of any year excepted).—*First* Prize (Lord Mayor's Champion Cup, value £10 10s., and £5) to Miss E. M. Herbert, Huntsham Court, Symond's Yat, Herefordshire. *Second* Prize (£3) to Miss E. M. Powell, Ballingham Court, Holme Lacy, Hereford. *Third* Prize (£2) to Miss Minnie Baldwin, Oldbury House, Lower Broadheath, Worcester.

MILKERS' CONTEST.

Class 106—Open to Men over 18.—*First* Prize (£5) to David W. White, Wolve's & Joye's Farm, Romford. *Second* Prize (£3) to Geo. B. Nelson, Cockerham Hall, near Garstang. *Third* Prize (£2) to Wm. Brown, Hedges' Farm, St. Albans. *Fourth* Prize (£1 10s.) to James Duxbury, Knowle Green, Longridge, Preston. *Two Equal Fifth* Prizes (£1 each) to Fred Henley, Long Marston, near Tring, Herts, and Robert Gorst, Dolphinlee Farm, Lancaster.

Class 107—Open to Boys under 18.—*First* Prize (£5) to J. Morrison, Mann Farm, Cliffe-at-Hoe, Rochester, Kent. *Two Equal Second* Prizes (£3 each) to Tom L. Masson, Attimore Hall, Hatfield, and W. Hawkins, Sandling Farm, Maidstone. *Third* Prize (£2) to W. Morrison.

Class 108—Open to Women over 18.—*First* Prize (£10) to Miss Rachael James, Llancayo, Usk, Monmouth. *Second* Prize (£7) to Miss M. L. Nisbet, Lordship Hinxton, Great Chesterford. *Third* Prize (£5) to Miss M. E. Richardson, Claughton Hall, Caton, Lancaster. *Fourth* Prize (£3) to Miss Eliza J. Barr, Lovegroves, Checkendon, Reading. *Fifth* Prize (£1 10s.) to Mrs. Susan M. Rennie, Home Farm, Snodland, Kent. *Two Equal Sixth* Prizes (£1) each to Mrs. M. Jones, New House, Staunton-on-Wye, Hereford, and Mrs. J. Robb, Grove Kennel Dairy, Retford.

Class 109—Open to Girls under 18.—*First* Prize (£5) to Miss D. M. Masson, Attimore Hall, Hatfield. *Second* Prize (£3) to Miss M. L. Nisbet, Lordship Hinxton, Great Chesterford. *Two Equal Third* Prizes (£2 each) to Miss Molly Cambridge, High Hall Farm, Shifnal, and Miss Jennie Rosser, Chapel Farm, How Chapel, Ross-on-Wye.

THIRTY-FIFTH ANNUAL REPORT OF THE COUNCIL

to the General Meeting of Members,

Wednesday, March 1st, 1911.

The Council have pleasure in reporting that the Association now consists of 974 Annual and 83 Life Members, making a total of 1,057, and three kindred Societies continue to be affiliated.

As the results of members' votes taken at the Half-yearly Meeting held at the Dairy Show, Mr. GEORGE FREDERICK ROUMIEU, J.P. (Surrey), was unanimously elected President for the current year, and Mr. J. A. SMITH (Suffolk) and Mr. ELDRED G. F. WALKER (Somerset) were elected to seats on the Council to fill vacancies caused by the retirement of Mr. W. C. BROWN and Mr. RICHARDSON CARR.

A keen loss was experienced in the early part of the year by the death of His late Majesty King Edward VII., for many years Patron. The Association has, however, to be congratulated on the fact that His Majesty King George V. has been pleased to grant His Royal Patronage.

As will be gathered from the Auditors' Report and Statements of Account attached hereto, there has been a considerable increase in both general and Dairy Show business during the year.

Unfortunately no increase in membership can be recorded. Notwithstanding that 160 members have been elected, a corresponding number of deaths and resignations have occurred, but the subscriptions received during 1910 amount to £906 8s., compared with £743 14s. 6d. during 1909, a very satisfactory state of affairs, and proves that the members are appreciating the Association's work more than hitherto; but against this there is an increased expenditure in connection with the Educational Work carried on at the British Dairy Institute, Reading—Examinations and Investigations—showing a loss of £415 5s. 7d. on General Account.

A source of much gratification is the continued success of the Dairy Show, the increased receipts on entry fees, contributions, admission money, advertisements, and sales which resulted enabling the Council to offer increased prize money, to improve the value of

the medals, and in various other ways to further promote the industry for which the Association was founded, and, at the same time, to show an excess of income over expenditure to the amount of £289 10s. 6d., compared with £256 12s., which was the result of the Dairy Show in 1909.

The year commenced with a balance of £614 12s. 10d., and notwithstanding the excess of expenditure over income on General Account being £117 2s. 9d. more than in 1909, the year closed with a cash balance of £598 13s. 7d.

The Dairy Show of 1911 will be held at the Royal Agricultural Hall, Islington, on October 3rd, 4th, 5th, and 6th. The Prize Schedules are now under revision, and will be, on completion, issued to members and exhibitors.

As a mark of respect to our late Patron, the Dairy Conference arranged to be held in Holland in June was abandoned, but it is proposed to again draw up a programme for a visit to that country this year, leaving England on the night of May 5th, and returning on May 14th, many assurances of a hearty welcome having been again tendered to the Association by the Agricultural Department of the Dutch Government and various other prominent societies. Full programme of same will be issued to members in due course.

During the year the Council considered the Milk and Dairies Bill introduced by Mr. Courthope, which Bill, however, has been withdrawn for the present. Consideration is also being given to the suggested alterations which the Home Office proposed to make in the Regulations and Rules of Factory and Workshop Act, as regards the employment of women and girls, but so far have not completed their deliberation thereon.

The Shops (No. 2) Bill also received the attention of the Council, who appointed a Committee to go thoroughly into the question. The decision arrived at was that the Bill, if passed in its then form, would render it almost impossible to carry on the dairy industry. A deputation to the Home Secretary was formed and instructed to impress upon him the absolute necessity for the whole of the dairy industry to be exempt from the provisions of the Bill. The Council propose to again urge this point should the Bill come forward in the present Parliament.

The Margarine Bill, introduced into Parliament again by Mr. D. Kilbride, having been considered by the Council, the following resolution was passed and forwarded to members, with a recommendation to bring same to the notice of their Parliamentary representatives, viz.:—

"The British Dairy Farmers' Association, having considered the Margarine Bill presented by Mr. D. Kilbride and other Members of Parliament representing all parties, agree with them and the Select Committee of the House of Commons on Food Adulteration, 1896, that to allow the sale of Margarine as a colourable imitation of Butter leaves an open door for fraud, and they desire to urge the absolute prohibition of the artificial colouring of Margarine to resemble or imitate Butter."

In connection with the Investigation into the Cellular Elements Present in Milk authorised by the Council, an application has been made to the Commissioners appointed under the Development and Road Improvement Funds Act, and it is hoped, in view of the widespread benefits which will result not only to the industry but to the general public, that a grant will be forthcoming to enable the work to be continued and be extended.

The Council had before them the Report of the Departmental Committee appointed by the Board of Agriculture and Fisheries to inquire into the Epizootic Abortion in Cattle, Part I., and considered same in conjunction with the recommendations of the Cattle Diseases Committee of the Central Chamber of Agriculture. The following resolution was adopted :—

"That in the opinion of the British Dairy Farmers' Association the proposals contained in the Report of the Cattle Diseases Committee of the Central Chamber on Epizootic Abortion in Cattle would not be in the best interests of stockowners, embodying as they do the obligations of

(*a*) Compulsory notification ;
(*b*) Veterinary inspection ; and
(*c*) Isolation.

The Council agree that the disease is contagious, and that it produces an enormous amount of loss annually to stockowners, but fear that the above proposals, while being extremely irksome and a hindrance to stockowners, especially dairy farmers, would not be effective in stamping out the disease, and therefore strongly urge the Central Chamber not to ask the Board of Agriculture to include the disease under the Contagious Diseases of Animals Act, pending the results of experiments which are being made in certain directions to combat the disease in another way, which experiments the Council have reason to hope will be successful."

It is understood that the recommendations of the Central Chamber of Agriculture have been withdrawn.

The Association continues to be associated with the University College, Reading, in the conduct of the British Dairy Institute, towards the cost of which the Government have once more made a grant of £300. The present new buildings, although involving the Society in a greater liability each year, have made it possible for the education given to be demonstrated and received to a better advantage than hitherto was the case in the old premises.

Two examinations for the Association's Diplomas and Certificates were held at the Institute during 1910, and one at Chelmsford, at the request of the Essex County Council. The following awards resulted, viz.:—

8 Diplomas for proficiency in the science and practice of dairy farming and dairying.

3 Teachers' Certificates.

11 Certificates of proficiency in the principles and practice of butter and cheese making.

3 Certificates of proficiency in the principles and practice of cheese-making.

12 Certificates of proficiency in the principles and practice of butter-making.

Several cases having been brought to the notice of the Council where the milk supply of members has been stopped in consequence of the fact that cases of infection have been stated to have arisen from the milk supplied, but upon samples having been submitted to bacteriological examination, the same had failed to confirm these statements, it is particularly requested that any such cases should immediately be reported to the Secretary, who will lay the facts before the Committee specially appointed by the Council to deal with such matters.

The Council hereby appeal to the Members to bring under the notice of agriculturists of all classes and dairy farmers in particular the objects of the Association, who by also becoming members will practically aid in developing its usefulness.

By Order of the Council,

FREDERICK E. HARDCASTLE,

Secretary.

British Dairy Farmers' Association.

FINANCIAL STATEMENTS.

Dr. GENERAL INCOME AND EXPENDITURE ACCOUNT for the Year ended December 31st, 1910. Cr.

EXPENDITURE.	£	s.	d.
Rent	113	15	6
Salaries	329	10	0
Printing and Stationery	83	17	0
British Dairy Institute, Reading—Current year's work	385	0	0
Examinations	132	3	4
Conference	12	8	11
Journal	161	17	3
Education	15	4	6
Postage	50	19	8
Officers' Retaining Fees	31	10	0
Auditors' Fees	18	18	0
Investigations	32	0	0
Law Charges	9	6	2
Depreciation of Furniture	4	15	6
Repairs to Furniture, &c.	9	3	6
Miscellaneous Expenses, including Subscription to Central Chamber of Agriculture, Bankers' Charges, and Sundries	99	2	9
	£1,489	12	1

INCOME.	£	s.	d.
Members' Subscriptions	906	8	0
Journal	18	4	7
Examinations	75	5	11
Interest on Investments	74	8	0
BALANCE, being excess of Expenditure over Income	415	5	7
	£1,489	12	1

Dr. DAIRY SHOW INCOME AND EXPENDITURE ACCOUNT for the Year ended December 31st, 1910. Cr.

EXPENDITURE.

	£	s.	d.
Entry Fees returned	37	13	4
Prizes to Exhibitors	2,957	18	8
Sales of Exhibits	771	16	10
Wages: Clerks and Assistants	233	19	10
Do. Labourers..	154	15	4
Printing and Stationery	178	14	3
Advertising	372	19	0
Rent of Royal Agricultural Hall	445	0	0
Fittings, &c.	588	13	9
Forage (Hay, Straw, &c.)...	68	9	10
Band	73	10	0
Judges' and Stewards' Fees	565	4	1
Refreshments	197	9	0
Postage	79	18	4
Working Dairies, Milk, Cream, Ice, &c. ...	149	3	6
Light, Water, &c.	188	7	11
Catalogue	212	4	1
Police...	73	15	2
Turnstiles	31	7	6
Steam...	40	6	2
Signs, Headboards, &c.	46	6	0
Decorations	23	1	0
Clearing Hall	10	0	0
Analyses	31	5	0
Miscellaneous Expenses: Insurance, Auctioneer, Badges, Rosettes, Lodgings, Baskets, Boxes, Bankers' Charges, and Sundries ...	172	0	7
BALANCE, being Excess of Income over Expenditure	289	10	6
	£7,993	9	8

INCOME.

	£	s.	d.
Entry Fees, Competitive and Non-Competitive	4,276	5	4
Catalogue Sales and Advertisements	339	15	3
Admission Money	1,997	16	6
Sales of Exhibits	935	5	7
Sales in Working Dairies, &c.	246	17	6
Contributions to Prize Fund	188	4	6
Miscellaneous	9	5	0
	£7,993	9	8

Dr. STATEMENT OF ASSETS AND LIABILITIES, December 31st, 1910. Cr.

LIABILITIES.	£ s. d.	£ s. d.
Sundry Creditors		99 1 4
On Account of Dairy Show, 1910— Sundry Creditors		214 10 4
Surplus of Assets over Liabilities— As at December 31st, 1909 ...	3,540 8 11	
Add—Excess of Income over Expenditure on Dairy Show Account	289 10 6	
	3,829 19 5	
Deduct—Excess of Expenditure over Income on General Account ...	415 5 7	
		3,414 13 10
		£3,728 5 6

ASSETS.	£ s. d.	£ s. d.
Investments at Cost:—		
£1,000 2½ per cent. Consols ...	938 4 10	
£800 L. & S.W. Railway 3 per cent. Debenture Stock	892 8 5	
£500 L. & N. W. Railway 3 per cent. Debenture Stock ...	475 0 6	
£500 Metropolitan Water Board "B" Stock	488 17 0	
		2,794 10 9
Furniture, £47 15s. 7d., less 10 per cent. depreciation		43 0 1
British Dairy Institute: Value of Appliances transferred to Reading ...		160 18 2
Show Appliances—One-third cost of Pails		30 0 0
Sundry Debtors		52 3 5
On Account of Dairy Show, 1910—		
Fees	6 6 0	
Advertisements	19 5 0	
Prize Fund	0 10 0	
Miscellaneous	7 10 0	
Sale of Exhibits	15 8 6	
		48 19 6
Cash		598 13 7
		£3,728 5 6

REPORT OF THE AUDITORS TO THE MEMBERS OF THE BRITISH DAIRY FARMERS' ASSOCIATION.

We have audited the foregoing Income and Expenditure Accounts and Balance Sheet with the books and accounts of the Society. We have received all the information and explanations we have required. In our opinion such Balance Sheet is a full and fair Balance Sheet containing the particulars required by the Regulations of the Society, and properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the information and explanations we have received and as shown by the Books.

HARRY DUNN,
FRED. RAMSAY,
FREDK. R. WELFORD,
ANNAN, DEXTER & CO.,
Chartered Accountants.
Auditors.

January 24th, 1911.

THE

British Dairy Farmers' Association.

THE OBJECTS OF THE ASSOCIATION

are the improvement of

DAIRY STOCK AND DAIRY PRODUCE,

by encouraging the Breeding and Rearing of Stock for the special purpose of the Dairy; a larger and more general production of Butter, Cheese, and Eggs; the Erection of Improved Dairy Buildings, and the Invention of New or Improved Dairy Utensils, Machinery, Implements, and Scientific Appliances. The Association also stimulates the Breeding and Rearing of Poultry, &c. By means of Papers in the Society's *Journal* (published annually), Annual Conferences in different dairy districts, Lectures, and Discussions, and in other ways, efforts are continually being made to disseminate a more thorough knowledge of Dairy husbandry.

Prizes to the value of about £3,000 are annually offered for competition at the Dairy Show held at the Royal Agricultural Hall, Islington, London.

It is difficult to over-estimate the importance and need of greater attention being paid to the Dairy industry. It is admitted that by improved modes of managing Milk and its products, the wealth obtained from the Milch Cows of the country could be increased most materially. The Council, therefore, appeal to Agriculturists of all classes, and Dairy Farmers in particular, who, by becoming Members of the Association, will practically aid in developing its usefulness.

The advantages of Membership comprise:—

1.—A free pass to all the Society's Dairy Shows, available each day during the Exhibition, with the privilege of admitting free (by ticket) a friend on any one day.

2.—The privilege of participating at specially low charges in the Dairy Conferences at home or abroad, organised by the Association.

3.—The Exhibition of Live Stock, Dairy Produce, and Utensils, at a reduced scale of fees (to Members subscribing £1 per annum).

4.—A copy (free by post) of the *Journal* of the Association, published annually; price 1s. to non-members.

5.—Analyses by the Analytical and Consulting Chemist, at low fees, of samples of milk, cream, butter, cheese, feeding stuffs, water, soil, manures, &c.; and advice on dairy matters connected with his Department.

6.—Professional advice and assistance at a reduced scale of charges, in any case of disease among the live stock of the farm.

7.—Examinations of plants and seeds by the Consulting Botanist on specially low terms.

8.—Examinations by the Consulting Pathological Bacteriologist, for particular pathogenic or disease-producing organisms.

9.—Investigations by the Consulting Dairy Bacteriologist into the cause of trouble or taints in dairy produce.

10.—In any case of apparent hardship in connection with the administration of the Model Milk Clauses, Members are recommended to at once send details of such case to the Secretary, who will submit the matter to the Committee appointed to deal with such matters, after which, advice and assistance will be given by the Association.

The Annual Subscription is £1, but Dairy Instructors and *bonâ fide* Tenant Farmers are admitted on payment of 10s. 6d. per annum. The latter sum entitles the Member to all privileges, except the reduced fees for exhibition at the Shows. A *bonâ fide* Tenant Farmer is deemed to be one who rents the whole of the land in his occupation.

Members' Veterinary Privileges.

Members of the Association who require professional assistance in any case of disease among their animals must apply direct to the Consulting Veterinary Surgeon, Mr. Sidney Villar, F.R.C.V.S., Harrow, Middlesex, whose scale of charge is as follows:—

	£	s.	d.
Personal Consultation	0	10	6
Post-mortem Examination and Report	0	10	6
Consultation by Letter	0	5	0
Visit and Report, in case of an outbreak of disease, in addition to personal and travelling expenses, per day	2	2	0

Members' Botanical Privileges.

The Council have fixed the following rates of charge for the examination of Plants and Seeds for the *bonâ fide* and individual use and information of Members of the Association (not being Seedsmen), who are particularly requested, when applying to the Consulting Botanist, to mention the kind of examination they require, *and to quote its number in the subjoined Schedule.*

No.	£	s	d.
1.—A Report on the purity, and amount of nature of foreign materials, of a sample of seed	0	1	0
2.—A Report on the perfectness and germinating power of a sample of seed	0	1	0
Nos. 1 and 2 together	0	1	6
3.—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention	0	1	0
5—Report on any disease affecting farm crops	0	1	0
4.—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value ...	0	4	0

Instructions for Selecting and Sending Samples.

The utmost care must be taken to secure a fair honest sample, When possible, at least one ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. Grass seeds should be sent at least four weeks, and clover seeds two weeks before they are to be used. In collecting specimens of plants, the whole plant should be taken up, and the earth shaken from the roots. If possible, the plant must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel. Specimens of diseased plants or of parasites should be forwarded as fresh as possible—either in a bottle, or packed in tinfoil or oil silk. All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstance (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry. Parcels or letters containing seeds or plants for examination must be addressed to the Consulting Botanist, Professor JOHN PERCIVAL, M.A., University College, Reading.

The charge for examination must be paid, in Postage Stamps or otherwise, at the time of application, and the carriage of all parcels must be prepaid. It must be distinctly understood that *no notice can be taken* of any application unless it is accompanied by the proper fee.

MEMBERS' CHEMICAL PRIVILEGES.

	£	s.	d.
MILK (Fresh).			
Estimation of Fat and Total Solids	0	2	6
Estimation of Fat, Casein, Albumin, Sugar, and Ash	0	10	6
MILK (Sour).			
Estimation of Fat and Total Solids	0	5	0
SKIMMED MILK.			
Estimation of Fat and Total Solids	0	5	0
CONDENSED MILK.			
Estimation of Fat	0	5	0
Estimation of Fat, Casein, and Solids	0	10	6
Estimation of Cane Sugar	0	5	0
HUMANISED MILK.			
Complete Analysis	1	1	0
CREAM.			
Estimation of Fat	0	5	0
Estimation of Fat, Casein, and Solids	0	10	6
Examination for Foreign Fats	0	10	6
BUTTER.			
Estimation of Water, Casein, and Ash	0	5	0
Examination for Foreign Fats	0	10	6

	£	s.	d.
CHEESE.			
Estimation of Water, Fat, and Casein	0	5	0
Examination for Foreign Fats	0	10	6
RENNET.			
Examination of Strength	0	5	0
CAKES AND MEALS.			
Estimation of Oil only	0	5	0
Estimation of Oil, Albuminoids, and Carbo-hydrates	0	10	6
GRASS, SILAGE, ROOTS, &c.			
Estimation of Oil, Albuminoids, and Carbo-hydrates, &c.	1	1	0
MANURES.			
Estimation of Phosphoric Acid	0	5	0
Estimation of Soluble and Insoluble Phosphoric Acid	0	7	6
Estimation of Nitrogen...	0	5	0
Estimation of Potash	0	5	0
SOIL.			
Estimation of Lime	0	5	0
Analysis and Report	2	2	0
WATER.			
Analysis for Drinking or Dairy Purposes	1	1	0
POISONS.			
Examination of a Substance for Mineral Poisons	2	2	0
Examination for Organic Poisons (Alkaloids, &c.)	3	3	0
CIDER AND FERMENTED DRINKS.			
Estimation of Alcohol	0	5	0
Estimation of Alcohol, Sugar, Acidity, &c.	0	10	6
PRESERVATIVES.			
Examining a Substance for Boracic Acid or Salicylic Acid, &c., for each Substance sought...	0	2	6
Estimation of the quantity of Boracic Acid	0	10	6
Analysis of a Preservative	1	1	0
COLOURING MATTER.			
Examination for Artificial Colouring	0	5	0
CONSULTATION.			
For Letter in reply to Enquiry...	0	5	0
For Personal Interview	0	5	0
For Special Consultation	1	1	0

NOTE.—The Consulting Chemist will be prepared to quote reduced terms to members requiring a number of analyses at frequent intervals.

Instructions for Taking Fair Samples for Analysis.

Dairy Produce.—Milk should be sent in a well-corked 8-oz. clear bottle. The milk should quite fill the bottle. Butter or cheese, about 8 ounces; the former in a gallipot well tied down.

Soils.—A block of soil about four or five inches square, and nine inches deep, should be sent in a strong box by rail.

Artificial Manures.—Take a handful of manure out of at least half a dozen bags, mix these rapidly and thoroughly, breaking down all lumps. Forward about a pound of the mixture in a tin box, and retain the remainder. Samples of manure should be sent immediately after the delivery of the bulk, and before settling the account. All manures should be bought subject to analysis.

Feeding Materials.—Feeding cakes, meals, or grains: about a pound should be sent in a bag or box. Grass and hay: a bundle of a few pounds weight. Silage: a six-inch cubic block, packed closely in a box to keep it compressed

Waters.—A Winchester quart glass-stoppered bottle should be procured from a druggist, well washed out with the water, then completely filled, the stopper tied securely down, and the bottle packed in a box and sent by rail.

N.B.—In order to prevent disappointment, the Chemist requests that, as far as possible, Members desiring to hold a personal consultation should make an appointment by letter. Between 12 and 3 are the hours most convenient. The fees for analyses of artificial manures and feeding stuffs are payable in advance, and only applicable to Members who are not commercially engaged in the manufacture or sale of the articles sent for analysis. All communications intended for the Analytical and Consulting Chemist must be addressed direct to Mr. F. J. Lloyd, F.C.S., Agricultural Laboratory, Muscovy House, 6, Trinity Square, London, E.C.

Members' Bacteriological Privileges.

Examinations by Dr. Andrewes, Pathological Laboratory, St. Bartholomew's Hospital, London, E.C.

	£	s.	d.
MILK.			
Cultural and experimental examination for a particular pathogenic organism	2	2	0
PASTEURISED OR STERILISED MILK.			
Cultural and experimental examination for a particular pathogenic organism	1	1	0
CREAM, BUTTER, OR CHEESE.			
Cultural and experimental examination for a particular pathogenic organism	2	2	0
WATER.			
Cultural and experimental examination for a particular pathogenic organism	2	2	0

INVESTIGATIONS BY MR. F. J. LLOYD, F.C.S., MUSCOVY HOUSE, 6, Trinity Square, London, E.C., INTO THE CAUSES OF TROUBLE OR TAINTS IN MILK, CREAM, BUTTER, OR CHEESE.

	£	s.	d.
MILK.			
Microscopical and cultural examination for a particular organism ...	2	2	0
Experimental and cultural examination for a particular organism £5 5 0 to	10	10	0
CREAM, BUTTER, CHEESE.			
Microscopical examination	0	10	6
Microscopical and cultural examination...	2	2	0
PASTEURISED OR STERILISED MILK.			
Microscopical examination for bacteria	0	5	0
Estimating number of bacteria present	0	10	6
Culture examination of bacteria present	2	2	0

Directions for Sending Samples.

Samples of milk or water (one quart) and cream (half pint) should be forwarded in wide-mouthed stoppered bottles which have previously been thoroughly cleaned, and then rinsed several times with very hot, almost boiling, water.

Butter is best sent in a ½-lb. brick or roll, just as it was made up, wrapped in grease-proof paper, and packed in a box.

If the *Cheese* is small, send a whole one; otherwise forward a square block of not less than one pound and not a wedge-shaped piece. Wrap in grease-proof paper and pack in a box.

All samples should be sent by the speediest method possible. They ought not to arrive either on Saturday or Sunday.

Samples to be examined for disease-producing organisms should be forwarded to Dr. Andrewes, Pathological Laboratory, St. Bartholomew's Hospital, London, E.C. Members are requested to note that in the case of examination for the tubercle bacillus the method of animal inoculation, which experience has shown to be the only reliable one, will be alone used. It is impossible to carry out the process of sedimentation necessary for the detection of tubercle bacillus in milk which is received in a curdled condition. The report cannot be sent for a period of four to six weeks from the time the sample is received, but in the case of other pathogenic organisms the time required is much shorter. Samples to be examined for organisms producing taints in dairy produce should be forwarded to Mr. F. J. LLOYD, F.C.S., Muscovy House, 6, Trinity Square, London, E.C.

THE BRITISH DAIRY INSTITUTE, READING.

The British Dairy Institute was established at Aylesbury in 1888, by the British Dairy Farmers' Association, and several hundred Students were successfully trained there in different branches of dairy work. In order that Students might have an opportunity of combining with the practical study of dairying a more complete scientific instruction, the Institute was, in 1896, moved to Reading, and placed under the management of a Committee representing the British Dairy Farmers' Association, and the University College, Reading.

The Institute contains large milk-receiving, butter-making, and milk-testing rooms; rooms for the manufacture of pressed, unpressed, and soft cheeses; and rooms for the ripening and drying of different varieties of cheese; besides reading, lecture, and common rooms. It is equipped with the best modern apparatus for the manufacture of dairy produce.

The instruction given is both practical and theoretical, and is arranged to suit the requirements of those who need either elementary or advanced dairy instruction, or who wish to perfect themselves in the manufacture of any special variety of dairy produce, including power-driven separating, pasteurizing, and butter-making plant, a steam turbine separator, and cold storage plant.

The Institute is open all the year round, with the exception of the Christmas Vacation of five weeks, which commences about the middle of December in each year.

Students may join at any time and for any period.

The manufacture of hard pressed cheeses extends from March to the end of September, but Stilton and other blue-veined varieties are only made during the period from May to September.

Soft cheese making is taught throughout the year.

During the winter months (October and November and January to March) instruction is given in butter-making, clotted-cream making, the testing and analysis of milk, bacteriology, the management of various types of separators, the handling and care of milk, and the preparation of starters, &c. Lectures and demonstrations are usually given in the afternoons, the mornings being chiefly devoted to practical dairy work.

Practical and theoretical instruction in butter-making and cheese-making (including hard-pressed, blue-veined, and soft cheese), £1 per week; £10 for three months; £18 for six months.

Practical and theoretical instruction in butter-making only, 10s. per week.

A full Prospectus will be sent on application to the Secretary, British Dairy Institute, Reading.

The British Dairy Farmers' Association.

LIST OF MEMBERS, JANUARY, 1911.

ABBISS, Miss Hilda C., Home Farm, Flitwick, Ampthill
Abbot, Richard (Abbot Bros.), Thuxton, Norfolk
Abbot, Thomas. Wymondham, Norfolk
Abbott, Edward (Abbott Bros.), Gun Lane, Limehouse, E.
Abbott, Harold Ray, Grange Hill, Chigwell, Essex.
Abbott, Philip E. (representing Abbott, Field, & Co., Ltd.) 7, Oakley Street, Waterloo, S.E.
Adams, Geo., Wadley House, Faringdon, Berks
Adams, John, Broomhurst Farm, Fleet, Hants; and 7, Moreton Street, Pimlico, S.W.
Adamson, J., 21, Charterhouse Street, E.C.
Adeane, C. R W , Babraham, Cambridge
Alexander, Albert L., Wi dermere, Sandown, Isle of Wight
Alexander, Geo., The Barns, Old Church Road, Stepney, E.
Alexander, Reuben C. Lawrence, Model Farm Dairy, Tidey Street, Devons Road, Bromley-by-Bow, E.
Alexander Separator Co. (represented by Harold V. Hunt), 18, Red Lion Street, E.C.
Alexander, W., jun., St. Mary's, Jersey
Allen, Captain Ralph, Rowland, Sawbridgeworth, Hertfordshire
Allingham, Sidney (representing Robert Boby, Ltd.), Bury St. Edmunds, Suffolk
Allsop, Hy., 89, Spencer Street, Birmingham
Andrew, A., Uplands, Hawkley, Liss, Hants
Aplin, James Shorland (representing Aplin & Barrett), Yeovil
Appleton, Fife, The Bar House, Beverley, Yorks
Arbuthnot, Jas. W., J.P., Elderslie, nr. Dorking
Arkwright, William, Sutton Scarsdale, Chesterfield
Armstrong, Miss Katherine Margaret, Purdomstown, Middlebie, Ecclefechan, Dumfriesshire
Arnold, Edwin Ross, The Cottage, Maidenhead
Arthurs, Frederick W., Bank Farm Dairy, Forest Row, Sussex
Ashby, Joshua J., Brixton Flour Mills, S.W.
Ashcroft, W., 13, The Waldrons, Croydon
Ashley, Mrs. E., Prospect House Farm, Irlam, Manchester
Ashton, T. W. H., Norwood, Booth Road, Altrincham
Assheton, R. C., Downham Hall, Clitheroe (L.M.)
Atkinson, Richard, 33, Heathfield Road, Wavertree, Liverpool
Atkinson, R. C., Spilsteds Farm, Sedlescombe, Battle.
Austin, Willie, The Knoll, Clevedon, Somerset
Avis, A. A., Stoke Farm, Stoke Bardolph, Nottingham (L.M.)
Aylesbury Dairy Co. Ltd. (represented by H. Whelan, Secretary), 31, St. Petersburgh Place, Bayswater, W.

BABCOCK, Miss R. B., Prize Poultry Yards, Rimington, Clitheroe
Baber, Francis, The Hall, Awre, Gloucestershire
Bailey, J. H., Eatons, Steyning, Sussex
Baily, J., & Son, 116, Mount Street, W., and Heathfield, Mayfield, Sussex
Baines, Clement, 121, Lower Addiscombe Road, Croydon
Baker, Benjamin Richard, 31, Barford Street, Islington, N.
Baker, Granville, Hardwicke. Gloucester (L.M.)
Baker, William Jas., Upper Hale, Farnham, Surrey
Balden, J. Whiteley, Bywell, Leeds Road, Dewsbury
Baldwin, William, St. Stephens Street, Tonbridge, Kent
Balls, James W., Yatscomb Farm, Foxcomb Hill, near Oxford
Barbour, G., J.P., Bolesworth Castle, Chester

Barclay, Edward Exton, Brent Pelham Hall, Buntingford, Herts
Barham, Arthur S., Denewood, Daleham Gardens, Hampstead, N.W.
Barham, Sir George, J.P., Danehurst, Hampstead, N.W. (L.M.)
Barham, G. Titus, Sudbury Park Farm, Sudbury, Harrow (L.M.)
Barlow, Frank Pratt, Lynchmore House, Haslemere
Barnard E. W., Kelsey Manor Farm, Beckenham
Barnes, Henry, 73, St. Helens Gardens, South Kensington
Barry, Major S., D.S.O., Pitsford Hall, Northampton
Barrymore, Lord, Fota, County Cork
Bartram, H., 7, Denman Street, Borough, S.E.
Bastard, William, Woodlands, Barkby, Leicester
Bateman, Frank, The Lodge, Shinfield, Reading
Bates, Oswald F., Harlow Court, Harrogate
Bates, Tom C., Sudbury Dairy Co., Sudbury, Derby
Baxendale, Francis Hugh, J.P., Framfield Place, Uckfield
Beauchamp, Sir Reginald P., Bart., Langley Park, Norwich (L.M.)
Bedford, Frank, Dudswell Farm, Northchurch, Berkhamsted, Herts
Bedford, Geo. Smith, County Education Office, Gloucester
Belgravia Dairy Co., Limited (represented by Fred. Pitts, Managing Director) 2, Exhibition Road, South Kensington, S.W.
Bell, Colonel, Guernsey (H.M.)
Bell, Geo. J., Standing Stone, Wigton, Cumberland
Bell, John, Cattlegate Farm, Enfield, Middlesex
Bellasis, Capt. R. Oliver, Shilton House, Coventry
Belper, Lord, Kingston Hall, near Derby
Bennett, Alfred, Medburn Farm, Elstree, Herts
Benson, John, The Kettering Dairy, Dalkeith Place, Kettering
Benson, Miles, British Dairy Institute, Reading
Bentall, E. E., Heybridge, Maldon
Bere, Mrs. A. A., Stoodleigh Barton, near Tiverton, Devon
Bernström, Herr John, Aktiebolaget Separator, Stockholm (H.M.)
Berry, A., Ballingdon Street, Sudbury, Suffolk
Berry, S. F., Old Wellbury, Hitchin
Bertodano, Baldomero de, Cowbridge House, Malmesbury
Beskow, Herr C., Bergedorfer Eisenwerk, Ltd., Bergedorf, Hamburg
Bethell, Thomas P., Crown Works, Boundary Place, Liverpool
Betts, Walter, Moreton, Thame, Oxon
Bewes, Charles, Gnaton Hall, Yealmpton, Devon.
Birch, R. E., Bryn Euryn, Colwyn Bay
Birmingham Dairy Co., Limited (represented by W. T. Harrison), Dalton Street, Birmingham
Blackburn, C., Head Street, Liverpool
Blackburn, George John, Oarside Dairy Farm, Liscard, Cheshire
Blackshaw, J. Frank, The Cottage, Bromsgrove
Blackstone, Edw. C., Stamford, Lincoln
Blessig, E. W., Coldharbour, Bletchingley, Redhill, Surrey
Blickfeldt, Soren Hoy, Cross Deep, Osterley Park Road, Southall, Middlesex
Blundell, Alfred, Limbury Manor, Luton
Blundell, Prof. E., Argyll House, Cirencester
Blundell, Stanley, Bendish House, Welwyn, Herts
Blyth of Blythwood, Lord, Stansted, Essex
Blyth, Wilson, Park Farm, St. Osyth, Essex
Bogg, Son, & Co. (represented by B. H. Bloomfield), Conduit Street, Upper Clapton, N.E.
Bøggild, Herr Mejeri Konsulent Bernhard, Frydendalsvej, 2 V., Copenhagen (H.M.)
Bolitho, Thomas Robins, Trengwainton, Heamoor, Cornwall (Agent: Lewellyn T. E. Llewellyn, Estate Office)
Bolton, Herbert James, Waltham Cross, Hertfordshire
Bourne, J. K., The Grove, Atherstone
Bourne, Walter Wm., Elmwood, Elms Lane, Harrow, Middlesex (L.M.)
Bradford, William Litler, Pendleton, Manchester

Brake, Ernest, Discove Dairy, Bruton, Somerset
Brand, Admiral The Hon. T. S., Glynde, Lewes
Brander, Miss Anna E. L., 919, Fulham Road, London, S.W.
Brazier, Frederick G , Ley House, Grandborough, Winslow, Bucks
Bridger, Richard, Durleigh Farm, Rogate, Sussex
Bridges, John H., Ewell, Surrey (L.M.)
Brierly, John, Newnham Hall, Rugby
Brigg, Thomas, Woodside, near Luton
Briggs, Harold S., Elliston, St. Boswells, N.B.
Brindley, Frank, The Peel Astbury, Congleton, Cheshire.
Bristol Wagon and Carriage Works Co., Ltd. (represented by G. Falconer Fry), Lawrence Hill, Bristol
Britch, Edwin, Thorn Brow Farm, Appleton, Warrington
British South Africa Co. (represented by G. H. Smith-Wright), 2, London Wall Buildings, E.C.
Britten, John, Little Billing, Northampton
Britten, R. Spencer, Holloway House, Beaconsfield, Bucks
Brocklehurst, W. S., Grove House, Bedford
Brocq, John Noble le, La Hougue Boëte, St. John's, Jersey
Brocq, Ph. le, La Chasse, St. Ouen's, Jersey
Brodie, George Gordon, Woodlands, The Park, Cheltenham
Brodie, W. A. G., Crighton Asylum, Dumfries (L.M.)
Bromley-Wilson, Sir Maurice, Bt., Dallam Tower, Milnthorpe
Brooke, Charles E., 206 and 207, Central Poultry Market, E.C. (L.M.)
Broomfield, John, 1, Clitheroe Road, Clapham, S.W.
Brown, Mrs. Agnes, Hedges Farm, St. Albans
Brown, Edward, The Chestnuts, Theale, Berks
Brown, E J., Thornholme, Brigg, Lincs
Brown, F. C., Barrow Hills, Longcross, Surrey
Brown, George, 1, Roe Street, Liverpool
Brown, G. B. M., Manor House, Heacham, near King's Lynn
Brown, James, Talfourd Lodge, Middle Deal Road, Deal, Kent
Brown, James (representing W. & J. Brown, nurserymen), Stamford
Brown, John, 2, Berkeley Place, Tunbridge Wells
Brown, Robt., Yew Tree House, Portbury, Bristol
Brown, Thomas S., Woodeaton, Oxford
Brown, W. C., Appleby, near Doncaster
Brown, Miss Martha, Lancashire C. C. Farm, Hutton, near Preston
Brownlow, Earl, Ashridge, Herts (Communications to Brownlow R. C. Tower, Bridgewater Estate Office, Ellesmere, Salop)
Brumbridge, J. P., 23, Craven Terrace, Bayswater, W.
Bryan, Frank, 122, Newgate Street, E.C.
Buckley, T. H. W., The Grange, Crawley Down, Sussex
Bull, Iris Lilian (Miss), The Dairy, Thursley Park, Winchester
Burdett-Coutts, Wm., M.P., Stratton Street, Piccadilly, S.W.
Burfitt, John Herbert, Charlton, Horethorne, Sherborne
Burfitt, Joseph, Goodedge Farm, North Bruham, Bruton, Somerset
Burge, Joseph Reginald, Posbrooke, Titchfield, Fareham, Hants
Burkitt, William, Grange Hill, Bishop Auckland
Burmeister & Wain (represented by Frantz Mortensen), 12, Coleman Street, London, E.C.
Burnham, Lord, Hall Barn, Beaconsfield, Bucks. (Agents, R. Spencer Britten, Holloway House, Beaconsfield)
Burns-Hartopp, Captain, Dalby Hall, Melton Mowbray
Burton, John H., M.Sc., F.H.A.S., County Education Office, Weston-super-Mare, Somerset
Bush, Barnard J., Manor Farm, Laverton, near Bath
Butcher, Henry Wm., 37 & 38, Mark Lane, E.C.
Butler, Isaac, Panteg House, near Newport, Mon.
Butler, Reginald, Wilts United Dairies, Ltd., Devizes
Bygott, William B., Rye Hill House, Wing, Oakham

CADDICK, Edward W., Caradoc, Ross, Hereford
Cadogan, The Earl, K.G., Culford Hall, Bury St. Edmunds (Agent, M. W. Mortimer, Estate Office, Culford).
Caillard, Sir Vincent, Wingfield House, near Trowbridge, Wilts
Calthrop Bros., Ltd. (represented by F. C. Calthrop), 56, Naylor Street, Liverpool
Cambray, Miss May, Baunton Farm, Cirencester
Candy, T. C., Woolcombe, Cattistock, Dorset
Candy, W. G., Blagrave Farm, Abingdon, Berks
Candy, William, 26, Lonsdale Road, Oxford
Cannell, George W., Hardley, near Loddon, Norfolk
Cannon, Henry, Milton Clevedon, Evercreech, Somerset
Carefield, John J., Caerville, Newnham, Glos.
Carmichael, J. M. Gilson, 39, Seething Lane, E.C.
Carr, Richardson, Home Farm, Tring, Herts
Carrick's Cumberland Dairy and Pure Milk Supply Company, Limited (represented by T. Carrick, J.P.), Low Row, Carlisle
Carroll, Prof. T., 1, Rostrevor Terrace, Rathgar, Dublin
Carson, Joseph, Crystalbrook Farm, Theydon Bois, Essex
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Carter, James, & Co. (represented by Gilbert Beale), 237-8, High Holborn, W.C.
Cary, William H., Steeple Ashton, Trowbridge, Wilts
Cash, J. E., Brackhill Farm, Redditch
Cathedral Dairy Co. (represented by Loram Bros.), Exeter
Cazalet, W. M., Fairlawn, Tonbridge. (Agent, C. L. Fox)
Cecil, Lady Arthur, The Mount, Lymington, Hants
Chabot, J. J., Seckford Hall, Woodbridge, Suffolk
Chalk, Vernon Beecher, Beckenham, Kent
Chandler, F., Gratton Cheese Factory, Gratton, Winster, Derbyshire
Cheers, Harold, Caughall Manor, Chester
Chevallier, John B., Aspall Hall, Debenham, Suffolk
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Chivers & Sons, Ltd. (represented by H. Henshaw), Histon, Cambs
Clark, Kenneth M., Sudbourne Hall, Orford, Suffolk. (Agent, J. Martin Longe)
Clarke, Mrs. Agnes M., Brooke House, West Hoathly, Haywards Heath
Clarke, J., & Sons (represented by Josiah Clarke), 46, Hill Rise, Richmond, Surrey
Clement, Thomas, jun., 27, South Albion Street, Glasgow
Coates, Nathaniel, jun., Hillesden, Bucks
Coats, Miss E. D., Brattles Grange, Brenchley, Kent
Cobb, Rhodes H., The Grove, Esher
Cobbald, A. H., Eldo House, Bury St. Edmunds
Codocol Company (represented by Sydney J. Lindley), Chorley Wood, Herts
Cole, R. D., Department of Agriculture and Technical Instruction for Ireland, 16, Upper Merrion Street, Dublin
Cole & Lewis, Ltd. (represented by W. H. Cole), Cirencester
Collings, Right Hon. Jesse, M.P., Edgbaston, Birmingham
Collins, William, Crafton, Leighton Buzzard
Comer, Mrs. N., Fanshaws Farm, Hertford
Comer, Miss Mary, Fanshaws Farm, Hertford
Compton, Alfred H., Buenos Ayres (L.M.) (all communications to c/o J. R. J. Neild, Esq., River Plate House, Finsbury Circus, E.C.)
Comyns-Lewer, Mrs. E., 6, Oakwood Avenue, Beckenham, Kent (L.M.)
Cook, A. C., Sligo, Ireland
Cook, Albert L., Orpington House, St. Mary Cray, Kent
Cook, Miss E. G., Ashford Farm, Ashford, Middlesex
Cook, William H., The Model Poultry Farm, St. Paul's Cray, Kent
Cook, W. W., The Abbey, St. Faith's, Norwich
Cooke, Frederick Roper, 4, Quex Road, High Road, Kilburn
Cookson, Miss Amy, Poulton, Pulford, near Wrexham
Coope, Capt. J. C. Jesser, Bulawayo, Rhodesia
Cooper, Allan, Norton Farm, Bishopstone, Sussex

Cooper, Bromage & Co. (represented by H. D. Butler), Sutton Hall Dairy Farm Sutton
Cooper, E. G., Richmond House, Handford Road, Ipswich
Cooper, Sir George A., Bart., Hursley Park, Winchester (Agent, James E. Thorold, Hursley Park Estate Office, Hursley, Winchester)
Cooper, Sir Richard, Bart., Ashlyns Hall, Berkhamsted, Herts
Coote, Col. Charles H. Eyre, Highgate House, Creaton, Northampton
Corbett, James Richard, More Place, Betchworth, Surrey
Corner, Dr. Harry, Brook House, Southgate, N.
Cornish Meat Provision Co. (W. A. Roynon), Bacon Curers, Redruth
Cornish, Mrs. C. J., Ergot Villa, Chiswick Mall, S.W.
Cornu, Col. Chas. Ph. Le, La Hague Manor, Jersey (H.M.)
Corrie, Harold, Quobleigh, Eastleigh, Hants
Cotching, Thomas, 19, Inglis Road, Ealing
Cowell, William P., The Lee, Elmdon, Saffron Walden
Cowley, William A., Ovingdean Grange, nr. Brighton
Cox, Harry T., Great Haners Farm, Bishops Stortford
Cox, James. jun., Manor Road Farm Dairy, Barnet
Cox, Miss L. M., 47, City Road, Cardiff, and 2, East Grove, Cardiff. (All communications to East Grove.)
Cox, William J., The Cardiff Milk Supply, City Road, Cardiff
Coxall, Samuel J. Shelford, Hall Farm, Hinxton, Cambs
Crabtree, James, 25–39, Price Street, Birkenhead, Cheshire
Crawford, Lady Gertrude, Coxhill, Lymington, Hants (L.M.)
Crawford, Hugh W. B., Chapmanton, Castle Douglas, N.B.
Cream Dairy Co. (represented by F. W. Bartlett), 27 and 29, Caledonian Road, King's Cross, N.
Crewdson, A., 107, Piccadilly, Manchester
Crewe, Earl of, P.C., D.C.L., Crewe House, Curzon Street, W.
Crompton, Chas. W., Hall Green, near Wakefield
Crompton, James R., Brandlesome House, Bury, Lancs
Crosher, John Thorpe, Melton Mowbray, Leicester
Cross, W. F., Chilswell, Iffley Road, Oxford
Crowley, Philip, Foords Farm, Horeham Road, Sussex.
Cruttenden, Geo. S., Beaufort Dairy, 90, Bohemia Road, St. Leonards-on-Sea
Cundy, Thomas, The Devonshire Dairy, Benbow Street, Stoke, Devonport
Curtis, Mrs., Fitzwells, Ewell, Surrey
Curtis, J. L. (Curtis Bros.), Valley Road, Streatham, S.W.
Custance, Mrs. Mary, Woodlands, Southwater, Horsham

DALE, C. J. (Messrs. J. Bourne & Son), St. Andrew's House, 34, Holborn Viaduct, Holborn Circus, E.C.
Dalrymple, Miss Mary, Elliston, St. Boswells, N.B.
Dalrymple-Hamilton, Col. North, Bargany, Girvan, Ayrshire, N.B. (L.M.)
Dancocks, George Wingfield, 177, Fulham Road, London, S.W.
Dare, Francis E., Halstock, Yeovil
Darlington, Joseph, Stanwardine Farm, Burlton, Salop
Darrell, Miss Mary, Ebberston, Snainton, R.S.O., Yorkshire
Daunton, George S., 1, Guilford Street, W.C.
Davies, Chas. Brereton, Eardswick Hall, Minshull, Middlewich, Chester
Davies, General H. F., Elmley Castle, Pershore (L.M.)
Davies, J. H., 36, Caxton House, Westminster, S.W.
Davis, Colonel, Salt Hill House, Slough
Davis, Lew, 75, George Street, Oxford
Davy, A. Cedric, Paternoster Row, Sheffield
Dawson, George, Dawson Bros., Leeds
Day, Chas. F., High Road, Clapton, N.E.
Day, Son, & Hewitt (represented by G. S. Hewitt), 22, Dorset Street, W. (L.M.)
Deane, Dennis Shepherd, Beaulieu Court Farm, Sunningwell, Berks
De la Warr, Countess, Buckhurst, Withyham, Sussex
Deverell, Edgar T., Dormers Leys, Tetsworth, Oxon

Deverell, H , Bourton, near Buckingham
Dickson & Robinson (represented by F Robinson), Cathedral Street, Manchester
Dixon, Ralph, Tardebrigge, Bromsgrove, Worcs.
Docking, Stanley R , 62, Dingwall Road, Croydon
Dougall, Miss Margaret T , Woodlea House, Bonnybridge, Stirling
Douglas, John, Baltic Wharf, Putney, S W.
Douglas, L. M., 3, Lauder Road, Edinburgh
Douglas, Thomas, Baltic Wharf, Putney, S W.
Dover, J G , Brightwell Hill, Wallingford (L M.)
Downer, A A., Drayton Manor, Chichester
Drake, H F , Francis & Co , Ltd , 50–52, Union Street, London Bridge, S.L.
Drewitt, Charles J , Drayton, Chichester
Drewitt, George, Bridge Street, Guildford
Driver, Edmund, 17, Westgate, Bradford
Drummond, Prof R J , Dairy School, Kilmarnock, Ayr
Duck, F. A , Moorlands Farm, Midhurst
Dugdale, J. Marshall, Llwyn, Llanfyllin, Mont
Duncombe, Capt. W H O , Waresley Park, Huntingdon
Dunmow Flitch Bacon Co , Ltd (represented by Wm. Hasler), Dunmow, Essex
Dunn, Archibald, jun , 22, St James' Road, Barnsbury, N.
Dunn, Henry, 22, St. James' Road, Barnsbury, N.
Du Val, John, La Caroline, St Peter's, Jersey
Dyer, Dr Bernard, B.Sc., F.C.S , F L S , 17, Great Tower Street, E.C.
Dysart, Earl of, Buckminster Park, Grantham

EDDIE, R., 17, Tyndale Place, Upper Street, N. (L.M)
Edmonds, T. W , 11, Greyhound Lane, Streatham, S.W.
Edney, James Phillpott, West Tytherley, Hants
Edwards, F. C , Grafton Yard, Hampstead Road, N W.
Edwards, Henry, jun., Ingleside Dairy, Chiswick, London, W.
Edwards, J. W., Fox Hall, Oswestry
Edwards, Sidney, Cwmdu, Maesycwmmer
Edwards, W. H., Brookfield, Pinhoe, Devon
Elliott, Sir Thomas H., K C B , 4, Whitehall Place, London, S.W.
Elliott, Wm , 97, Devonport Road, Shepherd's Bush, W.
Ellis, John B , Stanley House, St Ives, Hunts
Elwes, Harold T., Burstye Farm, Ardingly, Sussex
Emberton, Thomas, Birch Hall, Ellesmere, Salop
Emberton, William, Home Farm, Doddington, Nantwich
Emerton, Frank, 78, Grange Drive, Winchmore Hill, N
Emerton. H. J., Woodlands, Chase Side, Winchmore Hill, N.
Enfield, Viscount, Dancer's Hill, South Mimms, Middlesex
Ennals, Harry M., Park Road, Ipswich
Enock, Arthur Guy, Thane Works, Fountayne Road, Broad Lane, South Tottenham
Essex, Earl of, Cassiobury, Watford
Ethelston, Capt. R W , Malpas, Cheshire
Evans, James, Claremont Farm, Irlams-o'-th'-Height, Manchester
Evans, Richard H., University College, Reading
Eve, John George, North Ockenden Hall Farm, Romford
Evelyn, Mrs J. H. C., Wotton House, near Dorking, Surrey (Agent, E. W. Ellis, Estate Office, Wotton, Dorking)
Evens, John, Burton, Lincoln
Everest, Miss Ethel Gertrude, Chippens Bank, Hever Kent (L.M.)
Everett, Norman, Rushmere, near Ipswich
Ewing, Hugh, Birtley Farm, Bramley, Guildford
Ewing, M., Ashlands House, Crewkerne, Somerset
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Farmer, Samuel Wm., Little Bedwyn, Wilts
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Fawkes, Algernon Wolley, Wakefield (L.M.)
Fenwick, George Anthony, Hillmorton, Warwick
Field, Harry, 114, Blenheim Street, Hull, Yorks
Fisher, The Rt. Rev. Bishop, D.D. (Bishop of Ipswich), Burgh House, near Great Yarmouth
Fiske, George, Thornbush, Bramford, Ipswich
Fitzhardinge, Lord, Berkeley Castle, Gloucester (Agent, James Peter, Estate Office)
Fletcher, Charles J., Dale Park, Arundel
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Fordham, A. R., Melbourne Bury, Royston
Formby, Wm., The Cedars, Stratton St. Michael, Long Stratton, Norfolk
Forster, Miss Jane, Dairy Institute, Worleston, Nantwich
Fortescue, Earl, Castle Hill, North Devon (L.M.)
Fowler, W. Herbert, J.P., Claremont, Taunton (L.M.)
Fowler and De la Perrelle (represented by G. H. De la Perrelle), Porters Lane, near Royal Pier, Southampton
Fox, Robert, Grove Hill, Falmouth (L.M.)
Frank, John Wallace, Four Ashes, Llanymynech
Frankish, Captain Wm. E., Appleby via Doncaster
Franklin, Joseph, Scotsgrove House, Thame (L.M.)
Fraser, A. G., Londesborough Estate Office, Market Weighton, E. Yorks
Freeth & Pocock (represented by S. J. Pocock), Albert Embankment, S.W.
Freeth, F. H., Elmgrove, Park Road, Watford, Herts
French, James Thomas, Crystal Palace Dairy, Norwood, S.E.
Frost, Albert, Fox Farm, Sanderstead, South Croydon
Frowd, Herbert H., 16, Seaside, Eastbourne
Fuller, George, Worminghall, Thame, Bucks
Fuller, Sir J. M. F., Bart., J.P., M.P., Jaggards, Corsham, Wilts (all communications to H. G. White)
Fullwood & Bland (represented by Charles Bland), 31, Bevenden Street, Hoxton, N.
Furse, Miss Annie, Old Treworgey, Liskeard, Cornwall

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Gardner, Mrs. Chas. H., Rectory Farm, Pulloxhill, Ampthill
Garne, W. T., Aldsworth, near Northleach (L.M.)
Garrard, F. R., The Hall, Framlingham (L.M.)
Gates, B. F. J., Wing Park, Wing, Bucks
Gatty, Albert A., Bannister Hall, near Preston
Gibson, A., "Yarrow," Haywards Heath, Sussex
Gibson, T., 213, New North Road, Hoxton. N.
Gilbert, Arthur C., The Swanley Poultry Farm, Wilmington, Kent
Gilbey, Sir Walter, Bart., Elsenham Hall, Bishop Stortford, Essex
Gilders, John, Duchess Farm, St. Osyth, Kent
Gilderson, Robert, jun., Coach Works, High Road, Ilford, Essex
Gillings, A. H., Shirland Mews, Paddington, W.
Gilmour, W. P., Balmangan, Kirkcudbright, N.B.
Glover, Wilfred, Willoughby, Lutterworth
Glynn, Sir Richard G., Bart., Gaunts House, Wimborne, Dorset
Godman, Lieut.-Col. A. F., Smeaton Manor, Northallerton
Goff, J., Hale Farm, Edgware
Golland, Tom J., Appleby, nr. Doncaster
Goodburne, Henry Walmsley, Manor House, Althorpe, Doncaster
Gordon, Edward, Dunjop, Castle Douglas, N.B.
Gornall, Joseph, Claylands, Cabus, Garstang
Gouldbourn, Edwd., Wilksley, Whitchurch, Salop
Grabham, A., 139, Englefield Road, Essex Road, N.
Graham, George, The Moat, Much Hadham Her

Graham, Wm., Eden Grove, Kirkbythore, Penrith (L.M.)
Grant, Reginald, Springfield, Haverfordwest, Pembrokeshire
Grant, W. J., Pentonville, Newport, Mon.
Gray, Robert, Estate Office, Sherborne Park, Northleach, R.S.O.
Grayson, Thomas, 16 and 17, Queen Street, Derby
Great Western and Metropolitan Dairies, Ltd. (represented by Wm. Price), 7, Harrow Road, Paddington
Green, Charles Edward, Goring, Sussex
Green, Wm. Henry, Kersal Hall, Higher Broughton, Manchester
Greenall, Lady, Walton Hall, Warrington
Greenall, Sir Gilbert, Bart., Walton Hall, Warrington
Greenwood, Capt. Charles S., Swarcliffe, Birstwith, Leeds
Greetham, John, Goxhill, near Hull, Lincoln
Gregory, Abraham, Heath Croft Farm, Saighton, Chester
Griffin, J. Whitehouse, Towersey Manor, Thame, Oxon (L.M.)
Griffiths, Henry, 65, Eardley Crescent, Earls Court, S.W.
Grimsdale & Sons, Ltd. (D. Herbert Grimsdale), 2, Catherine Court, Seething Lane, E.C.
Grimsdell, Henry John, 36, Snow Hill, London, E.C.
Grocott, E. A., Haughton, Tarporley
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Gush, Geo. E., Thackham, Winchfield, Hants

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Harrison, Cyril H. G., Mentmore Estate Office, Ledburn, Leighton Buzzard
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Hebditch, Harry, Poultry Farmer and Appliance Maker, Martock, Som.
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Higgs, Wilfred, Den Barn Farm, Green Street Green, Orpington, Kent
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Richardson, W. Coates, Buff Orpington Poultry Farm, Northlands, Holbrook, Horsham Sussex
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Riggall, Frank, Croxton, Brocklesbury, Lincs.
Ryn, Dr. J. J. L. Van, 50, Mount Park Road, Ealing
Riley, John, Putley Court, Ledbury (L.M.)
Ripon, Marquis of, Studley Royal, Ripon
Robarts, G. L., New House Farm, Sheering, Harlow, Essex
Roberts, John, Spade Oak Farm, Bourne End, Bucks
Roberts, Mrs. E. A., Lleweni Hall, Denbigh
Robin, Colonel Philip, La Fantaisie, Jersey
Robinson, Chas., Tollesby Farm, Marton, R.S.O., Yorks.
Robinson, James (representing Robinson's Patents, Ltd.), 332, Goswell Road, E.C.
Robinson, Joseph, Iford, Lewes, Sussex
Robinson, Theodore R., 25, Campden Hill Gardens, Kensington, W.
Rogers, Samuel, Kidbrooke Manor Farm, Blackheath, S.E.
Rogerson, R. F., Henry Street, Brighouse, Yorks
Rosebery, Earl of, Mentmore, Leighton Buzzard (L.M.). (Agent, Cyril H. G. Harrison)
Ross, Benjamin J., Rosedale, Chilton, Ramsgate
Ross, John H., 130, Ferme Park Road, Stroud Green, N.
Ross, Sydney G., Lyndhurst, Henry Road, New Barnet
Rothschild, Lord, Tring Park, Herts. (Agent, Richardson Carr, Home Farm)
Rothschild, Lady de, Aston Clinton, Tring, Bucks. (Agent, F. R. Hervey Bathurst)
Rothschild, Leopold de, Ascot Lodge, Leighton Buzzard (Agent, J. Tarver, New Court, St. Swithin's Lane, London, E.C.)
Rothwell, Ernest (representing F. Rothwell & Sons), Milford, Surrey
Rothwell-Jackson, Chas. L., Moorfield, Tong-Moor, Bolton
Roumieu, G. F., J.P., Bethune House, Farnham, Surrey (L.M.)
Rowland, Miss Marjorie, Langton Manor, Wragley, Lincs

Rowntree, Alfred, Kirkby Overblow, near Leeds
Royal Guernsey Agricultural and Horticultural Society (represented by Henry Carré, Hougue Guilmine, Vale, Guernsey)

SADLER, James, Crewe Gates Farm, Crewe
Sadler, Wilfrid, Midland Agricultural and Dairy College, Kingston, Derby
Saker, Miss Dora G., Croft Cottage, Harpenden, Herts
Salisbury, Richard, 11, Edmund Street, Liverpool
Sanday, Saml., J P., Puddington Hall, Neston, Cheshire (Agent, Frank S. Smith, Puddington Hall Estate Office, Neston, Cheshire)
Sandbach, Col. S., Hafodunos, Abergele
Sanders, T. W., 124, Embleton Road, Lewisham, S.E.
Sanders, J. W., Gilmorton, Lutterworth, Leicester
Sandford, Thomas R., Torringville, Pans Lane, Devizes
Scatliff, Horace Parr, Bisham Lodge, Thames Ditton
Schmidlin, Hermann (The Titania Co.), 3, Southwark Street, S.E.
Scorer, C. E., Whitehall, Bracebridge Heath, Lincoln
Scorer, Fred., Nettleham Lodge, Lincolnshire
Seadon, Mrs. Elizabeth, The Apiary, Bromley, Kent
Shanks, Robt., Aigle Gill, Allonby, Maryport, Cumberland
Shapland, James L., Chaldon Court, near Caterham, Surrey
Sharp, G. T., 27, Sandgate Road, Folkestone
Shaw, Miss Caroline, Cheshire Dairy Institute, Worleston, Nantwich
Shaw-Hellier, Col. T. B., Wombourne Wodehouse, Wolverhampton
Sheedy, Miss M. E., Munster Dairy School, Cork, Ireland
Sheldon, Professor J. P., The Brund, Sheen, Buxton, Derby
Shepherd, Robert, Parkside Farm, Preston Brook
Shepherd, W., Burton Farm, Rossett, near Wrexham
Sheppy, James, Redlynch Park, Chewton Keynsham, Somerset
Shirley, J. L., Bletchley, Bucks
Shuttleworth, R. Kay, Slough Place, Cuckfield, Sussex (L.M.)
Silcock, R., & Son (represented by T. B. Silcock), Stanley Hall, Union Street, Liverpool.
Silk, B., Whitwell Farm, Coton, Cambridgshire
Silk, Bertie, W., Whitwell Farm, Coton, Cambridge
Simmons, Chas. Frederick, Rookholme, Elms Avenue, Eastbourne
Simmons, Stanley Chas., 18, Seaside Road, Eastbourne
Simon, Eric C., Lawnhurst, Didsbury, Lancs. (Communications to The Manor House, Icklesham, S.O., Sussex.)
Simpson, Charles, Walton Lodge, Broxbourne, Herts
Simpson, Thos., Bucklow Hill Farm, Plumbley, Knutsford, Cheshire
Simpson, Thos., Rook Tree, Haynes, Beds
Skelton, Allan, Rosewarne Farm, Woodham Ferris, Essex
Skelton, H. J., Seaholme, The Riviera, Sandgate, Kent
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Smith, A. Carlyle, Ashmoor, Campsea Ashe, Suffolk
Smith, Alex. F., Newhills Manse, Aberdeenshire
Smith, A. Gerald, Great Bealings, Woodbridge, Suffolk
Smith, Abel Henry, M.P., Woodhall Park, Hertford
Smith, Alfred J., Rendlesham, Woodbridge, Suffolk
Smith, Clement C., Scarsons, Trimley, Ipswich
Smith, Colin C. (representing W. H. Smith & Co.), Whitchurch, Salop
Smith, Miss Dorothy Mary, Grange Court, Portington, Howden, E. Yorks.
Smith, Frank B., c/o A. Croxton Smith, Burlington House, Wandle Road, Upper Tooting
Smith, Frank S., Puddington, near Chester
Smith, Gerald Dudley, Strensham Court, Worcester
Smith, Henry, Grange Court, Portington, Howden, Yorkshire
Smith, Henry P., North Hall, Wrentham, Suffolk
Smith, J. A., Eastern Counties Dairy Institute, Gippeswyk Park, Ipswich
Smith, Joseph, Cummersdale, near Carlisle

Smith, J., Thistleton, West Barsham, Walsingham, Norfolk
Smith, Lancelot Hugh, Mount Clare, Roehampton, Surrey
Smith, Montgomery, Kildavaig, Millhouse, Aberdeenshire
Smith, Hon. Mrs. Murray, Gumley Hall, Market Harborough
Smith, Hon. W. F. Danvers, M.P., Greenlands. Henley-on-Thames. (Agent, W. F. Holt Beever, Estate Offices, Yewden, Henley)
Smith-Barry, James Hugh, Stowell, Pewsey, Wilts
Smith-Neill, Captain J. W., Wendover Lodge, Wendover, Bucks
Smith-Ryland, C. A., Barford Hill. Barford, Warwickshire
Smyth, Lady E. F., Ashton Court Estate, Bristol. (Agent, H. B. Napier)
Snell, Samuel, Moore Farm, Petworth, Sussex
Snell, William Follett, Marsh Farm, Yeovil
Snewin, W. H., 47, Old Hill Street, Clapton, N.E.
Somervell, James (L.M.)
Somerville, Arthur F., Dinder, Wells, Somerset
Sorensen, C. Godfrey, 77, St. Thomas Street, S.E.
Spear & Vellacott (represented by J. S. Vellacott), East Hall, Rainham, Essex
Spencer, J. F., Hornsey Lane Farm, Highgate, N.
Spencer, Sanders, Holywell Manor, St. Ives, Huntingdonshire (L.M.)
Spencer, W. C., Manor Farm, Hillfield, Cattistock, Dorset
Spratt's Patent, Ltd. (represented by Stephen Wingrove), 24 and 25, Fenchurch Street, E C.
Spurr, Walter, Anderby, Huttoft, S.O., Lincs
Stacey, Robt., Hotel St. Cloud, Ramsgate
Stafford, J. G. W., The Farm School, Basing, Hants
Standring, Christopher, Wrelton Hall, Pickering, Yorks
Stanhope, F. J., Alma House, Claybrooke, Lutterworth
Stanier, Beville, M.P., Peplow Hall, Market Drayton, Shropshire
Stapleton, Alfred Edward, The Brooklands, Stoke Newington, N.
Stephenson, Robert, Burwell, near Cambridge (L.M.)
Stevenson, George, 35, Seaside, Eastbourne
Stevenson, Robert, Boghead, Galston, Ayr
Stevenson, William, West of Scotland Agricultural College, Glasgow
Stewart, Chas. D., Royal Agricultural College, Cirencester
Stewart, Sir Mark J., Bart., Ardwell, Stranraer, Wigtownshire
Stirling, Jas., Glasgow Dairy Co., Ltd., Glasgow
Stone, Ernest Frederick, 166, Fore Street, Exeter
Stone, Frank, Ewell, Surrey
Strachey, Sir Edward, Bart., M.P., Sutton Court, Pensford, Bristol (L.M.)
Straker, Mrs. John C., The Leazes, Hexham, Northumberland
Stratton, Basil K. (representing Uveco Cereals, Ltd.), Corn Exchange, Liverpool
Stratton, R., The Duffryn, Newport, Mon.
Streatfield, R. J., The Rocks, Uckfield, Sussex
Street, White, & Co., Park Mews, Cambridge Road, Kilburn, N.W.
Stretch, E. C., Fairfield, Ormskirk (L.M.)
Strickland, J. M., Warren House, Brandsby, Easingwold
Strutt, Hon. E. J., Terling Place, Witham, Essex. (Agent, Henry Isted)
Stubbs, Miss Jessie, County Education Office, Weston-super-Mare
Sturgeon, Charles, South Ockendon Hall, Essex
Sudeley, Lord, Toddington, Winchcombe (L.M.)
Sutton, Francis, Norfolk County Laboratory, London Street, Norwich
Sutton, M. J., Holme Park, Sonning, Berks
Sutton, R. H., Redlands, Horeham Road, Sussex
Swain, Percival (Platt & Swain), Wem, Salop
Swain, R., 169, Ladbroke Grove, North Kensington
Swan, E. Waller, Coneyhurst Court, Billingshurst, Sussex
Swindells, George C., Mayfield, Alton Road, Roehampton, S.W.
Swithinbank, H., Denham Court, Bucks (L.M.)

Talbot, F. W., Pitt, Winchester
Tamlin, William, St. Margaret's Works, Twickenham, Surrey
Tangye, A. C., Grove Farm, Rock, near Bewdley, Salop
Tattersall, Dr. Chas. H., Holmfield, Cheadle Hulme, Stockport, Cheshire
Tayleur, John W., University College, Reading
Taylor, G., Cranford Park, Hounslow, W. (L.M.)
Taylor, Harry D., The Place Farm, Haverhill, Suffolk
Taylor, Isaac, Stoneferry, Newland Road, Hull
Teather, Harold L., Stock Exchange, E.C.
Tebbutt, Miss Alice M., The Walnut Trees, Bluntisham, St. Ives, Hunts
Thellusson, Charles, Brodsworth Hall, Doncaster
Templeman, G. D., Hambridge, Curry Rivel, Taunton
Thomas, Miss Gwladys E., University College, Aberystwyth, Cardigan
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Thompson, Rev. W. Oswell, 15, Eaton Gardens, Hove, Brighton
Thorley, J., Woodhall, Shenley, Barnet
Thorley, Joseph, Ltd., King's Cross, N.
Thornton, Francis Hugh, J.P., Kingsthorpe Hall, Northampton
Threlford, Thomas, Foveran, Westbury Road, Woodside Park, N.
Thwaite, Chas. F., 276, Knight's Hill, West Norwood, S.E.
Tiarks, Herman Alexander, Webbington, Axbridge, Somerset
Tickle, Jos., Brompton Dairy Farm, Chatham, Kent
Tickle, Ralph, Bellevue House, Swanscombe, Kent
Tillotson, J. L., Heathfield, Bebington, Cheshire
Tinniswood, Robert, Rose Bank Farm, Dalston, Cumberland
Tisdall, A., Holland Park Farm, Kensington, W. (L.M.)
Todd, Alex., Midland Dairy Institute, Kingston, Derby
Topham, Frederick, Northwick Hall Farm, Worcester
Trafford, Sir Humphrey de, Bart., Hill Crest, Market Harborough (L.M.)
Travers, H., Middle Farm, Sutton Ditcheat
Trayler, J. N., The Oaks, Wembdon, Bridgwater
Tredegar, Viscount, Tredegar Park, Newport, Mon.
Trench, Col. Hon. W. le Poer, St. Hubert's, Gerrard's Cross, Bucks (L.M.)
Trevor, Frederick P., Coney Hall Farm, West Wickham
Trevor, Stanley Scott, Barkestone-le-Vale, Leicestershire (L.M.)
Trousdell, W. B. P., Maryland, Maidstone (L.M.)
Turnbull, Mrs. Archie, 7, West Maitland Street, Edinburgh (L.M.)
Turnbull, R. E., Ruswarp House, Ruswarp, near Whitby (L.M.)
Turner, Miss A. J., Tentercroft, Cuckfield, Sussex
Turner, Harcourt C., Long Acre Farm, Cuckfield, Sussex
Twining, Arthur B., 225, Strand, W.C. (L.M.)
Tyrwhitt-Drake, H. G., Cobtree, Sandling, Maidstone

Uniake, A. G., Gorseley House, Upper Hardres, Canterbury
Upton, Edward, Coptfold Hall, Ingatestone, Essex

Vallance, W. Dunscourt, 63, High Street, Gillingham, Kent
Van De Weyer. Victor W. Bates, New Lodge, Windsor Forest
Van Haeften, Baron, Westlington House, near Aylesbury (L.M.)
Venner, Richard J., Westgate, London Road, Reading
Venner, Wm. John Day (M. Venner & Sons), Reading, Berks
Verdin, Wm. H., Darnhall Road, Winsford, Cheshire
Verrey, Louis C., The Warren, Oxshott, Surrey
Viking Rennet Co., Ltd. (represented by R. Mollenhauer) 22, Chatham Place, Hackney. N.E.
Villar, Sidney, V.S., Greenhill, Harrow
Vincent, T. E., South West Dairy Co., Sherborne, Dorset

Vipan & Headly (represented by E. P. Headly), Church Gate Works, Leicester
Voelcker, Dr. J. A., 20, Upper Phillimore Gardens, Kensington, W. (L.M.)

WADE, Herbert Louis, J. P., Oaklands, Knowle, Warwickshire
Waide, W., & Sons (represented by R. Waide), Crown Point Road. Leeds
Walker, Miss A. B., Earl Cadogan's Dairy, Home Farm, Culford, Bury St. Edmund
Walker, Eldred G. F., The Hollies, Chew Stoke, near Bristol, Somerset
Walker, Henry Faure, Highley Manor, Balcombe, Sussex
Walker, J. W., Normansted, Henley-on-Thames
Walker-Jones, Colonel F. A., The Manor House, Burton, Westmorland (L.M.)
Wall, Geo. Vallance, 12, Moscote Park, West Kirby, Cheshire
Wallace, Miss Mary, The Wards, Elgin
Wallace, Prof. R., University of Edinburgh
Wallace, Robert Hedger, 4, East Grove, Tredegarville, Roath, Cardiff
Wallin, George, 54, Great Dover Street, Borough, S.E
Wallis, Harry, Northend, Warley, Brentwood, Essex
Ward, Alfred J., Thorpe Lea, Egham
Ward, R. Bruce, Westwood Park, Droitwich, Worcester
Warman, Joseph, Globe Dairy, 11, Idmiston Road, Stratford, E.
Warner, Frank, Bellegrove, South Woodford, Essex
Warren, W. J., Cornish Dairy Co., Helston
Warth, Thomas Herbert, The Grange, Raunds, Wellingboro'
Watkins, George Pearl, Culpho Hall, near Ipswich, Suffolk
Watkins, Wm. E., The Cottage, Willoughby Road, Ipswich
Watney, Dr. Herbert, Buckhold, Pangbourne
Watt, James, J.P., Knowefield, Carlisle, Cumberland
Webb, H. W., Eden Park Farm, Upper Elmers End, Beckenham, Kent
Wedd, Walter James, College Farm, Meldreth, Cambridge
Wedell, Count, Wedellsborg, Assens, Denmark (H.M.)
Weightman, Albert, Middle Herrington Dairy Farm, Durham
Weightman, W. A., The Hall Farm, Silksworth, Durham
Welch, Christopher, 21, Ellerker Gardens, Richmond, Surrey (L.M.)
Welford, F. R., Elgin Avenue, St. Peter's Park, W.
Welford, R. W., Theberton, Mapesbury Road, Brondesbury, N.W.
Welford & Sons, Limited (represented by John Welford, J.P.), Warwick Farm Dairies, Elgin Avenue, St. Peter's Park, W.
Wenlock, Lord, Escrick Park, York
Wensleydale Pure Milk Society, Ltd. (represented by C. W. Walker-Tisdale), The Dairy, Northallerton, Yorks
West, Thos., Highfields Dairy, Hanover Street, Leicester
West, Wm. J. G., 74, South Street, Bridport
West London Dairy Company, Limited (represented by H. T. Warren), 6, Spring Street, Paddington, W.
West Surrey Central Dairy Co. (represented by C. A. Gates), Guildford
Westropp, C. H., Melford Place, Long Melford, Suffolk
White, D. W., Wolves & Joyes Farm, Noak Hill, Romford
White, Oscar J., Morden Hall Farm, Morden, Surrey
White, R. Eaton, Boulge Hall, Woodbridge, Suffolk. (Agent, J. Symonds, Thistleton Hall, Burge, Woodbridge)
Whitley, H., Primley Hill, Paignton, S. Devon
Whitley, Samuel R., Little Westlands, Lingfield, Surrey
Whitley, William, Primley, Paignton, S. Devon
Whittle, Edward J., Edwards' Creameries, Ltd., Granby House, Granby Street, Hampstead Road, N.W.
Whittorne, Herbert, Clevedon, Dingwall Avenue, Croydon
Wickham, George, Stone Wall, Limpsfield, Surrey
Wickham, William, Terminus Chambers, Duke Street, London Bridge, S.E.
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Wigmore, J. R., Fritwell, Banbury

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Wilkinson, Mrs., Burrow House, Scotforth, Lancs
Wilkinson, John Wm., The Farm, Aldwickbury, Harpenden, Herts
Williams, Mrs. G. H., Cold-y-Goras, Cardiff
Williams, Mrs. John, Scorrier House, Scorrier, Cornwall
Williams, P. D., Lanarth, St. Keverne, R.S.O.
Williams, Mrs. W. H., Walcot Dairy, Lydbury North, Shropshire
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Willoughby, Frank, Estate Office, Merstham, Surrey
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Winberg, Principal Dr. H., Alnarps Landtbruksinstitut, Akarp, Sweden (H.M.)
Winchester, Marquis of, Amport St. Mary, Andover, Hants
Wingfield, A. H., J.P., Ampthill House, Ampthill, Beds
Wodehouse, Charles E., J P., Woolmers, Hertford
Wolseley Sheep Shearing Machine Co. (represented by H. S. Hotson), Sydney Works, Alma Street, Birmingham
Wood, A. H. E., Browhead, Windermere (L.M.)
Wood, Wm., Courtlands, Rockfield Road, Limpsfield, Surrey
Woodiwiss, Sam, Graveleys, Great Waltham, Suffolk
Woods, George, South Coast Dairy Co., Ltd., The Creamery, Plumpton, Sussex
Woods, Ralph, Farnborough, Hants
Woods, Wm. Henry, J.P., Moor Park Avenue, Preston, Lancs
Wright, Alex., The Mount, Bacup, Lancs
Wright, Professor R. Patrick, West of Scotland Technical College, Glasgow
Wright, Samuel J., The Upper Culm Valley Creameries, Taunton, Somerset
Wyse, Miss Ella, Shropshire Technical School for Girls, Radbrook, Shrewsbury

YELD, Miss Nellie, Hereford County Council, Shirehall, Hereford
Young, James A., Osterley Court, Heston Road, Isleworth

AFFILIATED SOCIETIES.

The Blackpool and District Dairy Farmers' and Milk Producers' Association. Secretary, Richard Bibby, 22, Birley Street, Blackpool, Lancashire.

Northumberland and Durham Dairy Farmers' and Milk Producers' Association. Secretary, Oswald M. McBryde, Broomhaugh, Riding Mill-on-Tyne.

The Dairy Students' Union. Secretary, Wilfrid Sadler, Midland Agricultural and Dairy College, Kingston, Derby.

N.B.—Members having any alterations to make in the Names and Addresses, as published in this List, are requested to give notice of the same, in writing, to the Secretary.

ABBREVIATIONS—(H.M.) Honorary Member. (L.M.) Life Member.